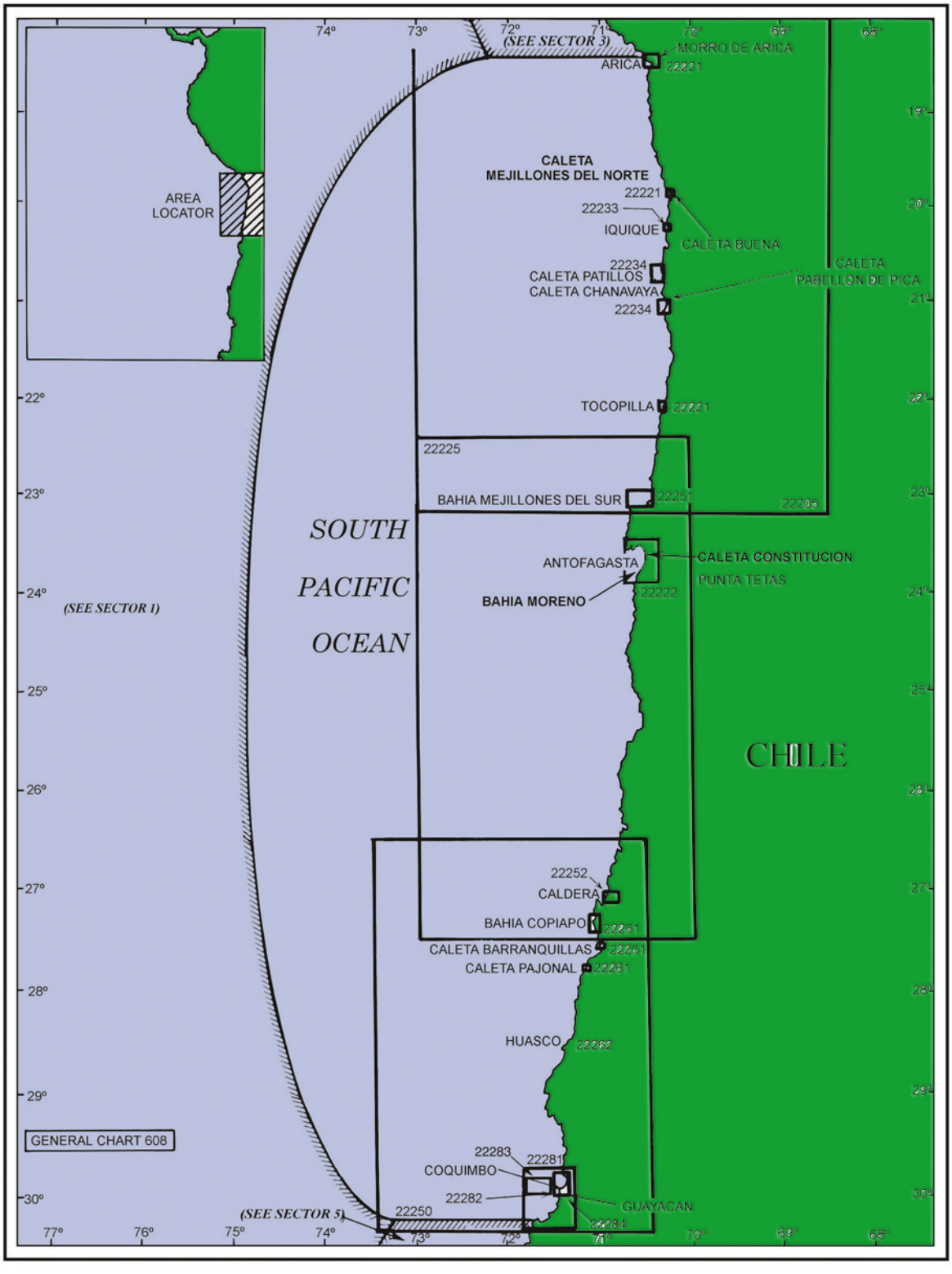
Click on "See Sector" to be Linked to that Sector.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **4** — CHART INFORMATION

Table of Contents

Table of Contents

SECTOR 4

CHILE—ARICA TO PUNTA LENGUA DE VACA

Plan.—This sector describes the coast of Chile from Arica to Punta Lengua de Vaca (30˚14'S., 71˚38'W.). The sequence of the description is from N to S.

General Remarks

4.1 Several of the larger bights and bays along this coast are suitable for large vessels. In addition, there are numerous small bays and bights which may be used by small vessels with local knowledge.

There are a number of prominent points and headlands. Numerous islets and rocks lie close off the coast.

From Arica S to the S limit of this sector, almost the entire length of the coast consists of desert. Vegetation is sparse except in some of the oases and cultivated areas. The coastal cordillera follows close to the sea, leaving a coast that is high, level, and steep. There are few natural harbors along the coast. The Andes Mountains back the entire coast about 30 to 60 miles inland and rise to general heights of 1,524 to 3,048m. Many of the summits attain a height much greater than 3,048m.

The rivers along this coast consist of mountain torrents that are fed by the melting snows of the Andean cordillera and disappear into the desert. The waters of these rivers are used for irrigation, domestic, and industrial purposes. The Rio Loa, N of Punta Chileno, is the only river that crosses the desert and reaches the sea during all seasons.

In general, the sea fronting this coast is deep. Above and below-water dangers fringe many parts of the coast. Shore banks extend 2 miles offshore in a number of places. Caution must be exercised due of the lack of soundings. Uncharted dangers may exist. In addition, the charts have been reported not to conform with the actual coastal configuration in a number of places.

The geographic positions given in this sector have been obtained from the latest available Chilean charts and may differ as much as 1.2 miles S, 3.5 miles N, or 2 miles E from their charted positions.

Antofagasta is the largest port in northern Chile. The ports of Arica, Iquique, Tocopilla, Taltal, Chanaral, Caldera, Huasco, and Coquimbo are important. In addition, there are a number of smaller roadsteads and ore-loading ports that are visited by coastal vessels or large vessels.

The principal points, islands, and harbors are lighted. Fog occurs along this coast at infrequent intervals, the average being less than one or two days a month. The high peaks of the Andes Mountains are often hidden by clouds.

Tides—Currents.—The currents off the coast of Chile are influenced by the Peru Current. In general, the current sets N parallel to the coast at a velocity of 0.5 knot. It sets slightly stronger from May to October than from November to April. The current is generally stronger near the land than at sea.

A current setting S at a velocity equal to or greater than the N current may occur occasionally and suddenly at any time of year. The periods during which this phenomenon occurs cannot be predicted as it appears to be influenced neither by the seasons, phases of the moon, nor a change of wind to a N direction. It has been reported that along the N coast of Chile, the Peru Current moves in certain circular directions, which are of particular importance to the local fishermen. The expressions "when the current approaches" and "when the current departs" are commonly used in this area; there is an abundance of fish in the former case, while in the latter the fish are less numerous.

At any position along the Chilean coast N of 50˚S, after N or NE winds have been blowing, a coastal current setting S or SE may be expected. Currents of a local nature are described in the various parts of this sector with the features off which they occur.

The tidal wave is generally propagated along the Chilean coast from N to S. Tidal currents of a local nature are described with the features off which they occur.

Note.—See Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia for details on regulations pertaining to vessels entering Chilean waters.

The Chilean Ship Reporting System (CHILREP) is a voluntary reporting system operated by a directorate of the Chilean Navy. Details of the system are found in Pub. 120, Sailing Directions (Planning Guide) Pacific Ocean and Southeast Asia.

Caution.—Submarine exercise areas extending up to 30 miles offshore, lie in the waters within this sector, and are shown on the chart.

Arica (18˚28'S., 70˚20'W.)

World Port Index No. 14800

4.2 Arica lies at the SE end of Rada de Arica. The port is more important for the transshipment of goods to and from Bolivia than for local imports and exports. Bolivia maintains a customhouse in the port.

Arica Home Page

http://www.puertoarica.cl

Winds—Weather.—Southwest winds prevail nearly the entire year. These winds may be considered a sea breeze. A steady wind may be expected from noon until dusk, when it abates. On rare occasions a land breeze may blow from the E; such a wind is always very light and generally dies out by dawn.

Fogs, called "calimas" or "camanchacas," occur most frequently from May to September. During and after October these fogs are generally partial and occur only in the morning.

Normally, the sea from the SW is calm in the morning, but increases somewhat in the port in the afternoon and evening. Heavy storms from the S, caused by S winds, may be ex-

Return to paragraph: 3.61

perienced and last for several days. The sea becomes continually rougher until the second or third day following the onset of the storm, when it reaches its maximum. Such storms usually occur in the winter months of June, July, and August and last three or four days. Harbor work and traffic in the port may be interrupted for five or six days. Northeasterly storms, caused by land breeze, may enter the port, but are not as severe as those from the south.

Tides—Currents.—The mean tidal rise at Arica is 0.6m, while the spring rise is 0.9m. A current setting NE enters the roadstead. This current is caused by the prevailing SW winds and its rate is proportional to that of the wind that has blown on the preceding days. During calm weather, a weak current setting S is experienced.

Aspect.—From a distance of 25 to 30 miles, Morro de Arica, close S of the port, and Morro Gordo, about 0.5 mile further S, form a good landmark. On a clear day Ciudad de Tacna, 29 miles N of Arica, and a valley rising gradually to meet it, are visible from seaward. To the E rise some of the highest peaks of the Andes. Volcan Misti lies about 140 miles NNW of Arica and is often visible. It is conical and snow covered.

On closer approach, the coast behind the roadstead appears low. It trends S and SW, terminating in the heights of Morro de Arica. Isla Alacran, close W of Morro de Arica, is joined to the mainland by a breakwater. A cross stands on Cerro La Cruz, a hill SE of the town. Two prominent water towers stand on the NE slope of the hill, close to the cross.

Conspicuous tanks stand about 1.5 miles ESE and a little over 2 miles SSE of Isla Alacran.

Numerous prominent radio masts and a conspicuous television mast, showing red obstruction lights, lie SE of the port.

Main lights are shown from Isla Alacran and the head of Muelle de Abrigo. The lights on the breakwater are reported to be visible at greater distances than the lighted aids to navigation. Four floodlight towers at a stadium situated about 2 miles E of Isla Alacran are prominent and marked by fixed red obstruction lights. An airport, from which numerous prominent lights are shown, is situated about 8 miles N of the port.

Morro de Arica is a granite bluff which rises steeply from the sea. A flagstaff, lighted at night, stands on the summit of Morro de Arica. Morro Gordo is a semi-conical hill about 0.5 mile S of Morro de Arica. At a distance of 25 to 30 miles, Morro de Arica has the appearance of a whitish cliff, the S slopes of which unite with Morro Gordo a short distance from the sea.

Isla Alacran, a low island of whitish appearance, lies with its W extremity nearly 0.5 mile W of Morro de Arica. A small flat-topped hill, 15.8m high, stands near the center of the island, which is connected to the shore by a causeway. A short breakwater extends from its shore.

Berths.—The harbor consists of Rada de Arica and Muelle de Abrigo, an L-shaped breakwater extending WNW from the shore N of Morro de Arica, and then in a NNE direction. Six berths, numbered from the root to the seaward end along the inner face of the breakwater, are available.

Generally, vessels are limited to 200m in length, but it was reported that a vessel of 51,891 dwt and 219m in length had been accommodated in the harbor. Muelle Fiscal, just E of the breakwater's root, has an alongside depth of 3m and is used by lighters. Vessels also anchor or moor in the roadstead where cargo is worked by barges. The roadstead is one of the best anchorages on the coast, but it is exposed to frequent SW swells as indicated above with the winds and weather for the port.

Berths	Length	Depth
No. 1	114m	4m
No. 2	200m	6m
No. 3	200m	9m
No. 4	170m	10m
No. 5	170m	10m
No. 6	170m	11m

A yacht harbor, protected by a breakwater, lies close E of Isla Alacran.

A crude oil export berth is available about 0.6 mile NE of the breakwater head, which is able to accommodate vessels up to 60,000 dwt, with a maximum draft of 13.1m. A second berth, for clean oil products, lies about 0.5 mile NE of the breakwater head and is capable of handling vessels up to 45,000 dwt, with drafts of 9.8m.

Vessels moor on a SW heading with both anchors down at both of these offshore multi-point moorings. Vessels secure with lines out to three stern buoys at the crude export berth, or two buoys at the clean products berth.

An oil terminal submarine pipeline extends 0.2 mile SW from the shore in St. Martin Bay, about 2 miles SSE of Isla Alacran, to an offshore berth. Reports have indicated that the terminal will accept vessels with a maximum draft of 13.7m at the multi-point mooring. Vessels are berthed heading WSW with both anchors down and the stern secured with lines to three mooring buoys. It is reported that berthing and unberthing take place only at dawn while the land breeze lasts. It is also recommended not to attempt to berth while a swell is running.

Pilotage.—Pilotage is compulsory, and may be had at the boarding ground situated about 0.8 mile NNW of the head of Muelle de Abrigo. Pilotage is available from "ARMADA NACIONAL." The vessel’s ETA should be radioed in advance of arrival; VHF channel 16 is available.

Anchorage.—The recommended anchorage lies about 0.8 mile from the head of Muelle de Abrigo, in depths of 15 to 20m, sandy bottom. This anchorage is exposed and it has been reported (1992) that vessels will roll to the prevailing SW wind and swell. Vessels working explosives anchor at the quarantine anchorage which is situated 1 mile, bearing 345˚ from the head of Muelle de Abrigo. Vessels arriving overnight may anchor at the pilot boarding ground.

Regulations.—The port is the N quarantine station for Chile and is a first port of entry. Vessels bound for "non-port-of-entry" ports must call at Arica first, unless specifically exempted.

An IMO-adopted Traffic Separation Scheme lies in the approaches to the port and may best be seen on the chart. The inbound traffic lane is situated on the S side of the separation zone.

The size of cargo in transit to Bolivia through the port is limited by the tunnels and the length of railroad cars; it is reported that the length of a railroad car is about 10m, the

height of the tunnels is 3.2m, and the width of the tunnels about 2.7m.

Caution.—Several dangerous wrecks and obstructions lie within the vicinity of the port and may best be seen on the chart.

A sewer pipeline extends about 1.3 miles WNW from a point on the shore 1.5 miles NE of the harbor entrance. An area in which anchoring and fishing are prohibited lies adjacent to the pipeline and can be seen on the chart.

Additional submarine cables, best seen on the chart, extend seaward from a point on the coast N of the oil berth anchoring and fishing prohibited area.

4.3 Punta Paloma (18˚33'S., 70˚20'W.), about 4 miles S of Isla Alacran, projects a short distance seaward from the coastal cliffs. A prominent white rock lies on the beach on the N side of the point. Meseta Condor, a precipitous hill about 2 miles NE of Punta Paloma, rises to a height of 128m. A fish processing factory and an oil installation on the shore below the hill are lighted and prominent.

Bajo Paloma, a stony patch with depths of 3 to 3.9m, lies about 0.5 mile offshore and the same distance N of Punta Paloma. Rocas Pajaros consist of three rocks, awash, which lie close offshore about 1 mile SSW of Punta Paloma. About 1 mile S of Punta Paloma, a large white stripe on the coastal cliff is a good landmark and can be seen for 15 miles in clear weather.

Punta Blanca lies about 3 miles SSW of Punta Paloma. The base of the point is almost completely white and is visible a considerable distance. A small rock, awash, lies off the point.

Cerro Solitario lies about 2 miles SSE of Punta Blanca and is conspicuous because of its conical shape. A wooden pyramidal beacon stands on the summit of the hill. Cerro Solitario is the NW termination of Sierra de Camaraca, a mountain about 2 miles SW which rises to a height of nearly 949m.

Punta Baquedano (18˚39'S., 70˚21'W.), about 4 miles S of Punta Blanca, is very prominent. At its outer end, the point consists of a low stony hummock. It is backed by high cliffs which rise rapidly inland to a height of 883m. A little farther S, the elevation increases to 927m. Punta Baquedano is the most conspicuous point between Morro de Arica and Punta Argolla. Roca Vitor lies awash about 0.5 mile off this point and is always visible because of the breakers over it.

Punta Pinto is about 4 miles S of Punta Baquedano and Cabo Condell lies about 3.5 miles farther SSW. The former point is high and cliffy; it has no beach and rocks, awash, lie close off it. The latter point has a 664m hill about 1 mile E of it.

Caleta Vitor (18˚46'S., 70˚21'W.), about 2.5 miles S of Punta Pinto, is a cove which is entered between Cabo Condell and Punta Thomson, about 1 mile NE. It is completely open W and exposed to the SW wind and sea which prevail for nearly the whole year. The cove indents the coast about 0.5 mile E of a line connecting these two points. The S shore of Caleta Vitor is low, rocky, and is backed by high cliffs. Cerro Orella, the highest summit, rises to a height of 682m about 0.5 mile SE of the SE shore. The entrance to a large cave on the S side of the cove is visible at a considerable distance from the N. Islote Morrito, a white, conical islet 47m high, lies close offshore W of the cave. A coast guard post, in a prominent white house with brick walls, is situated on the E side of Caleta Vitor.

Quebrada Vitor is a ravine which extends E from the E shore of Caleta Vitor. It is about 0.5 mile wide and passes between hills nearly 610m high. The ravine is generally dry but may have considerable water in it during the melting of the snows in the Andes. The beach off Quebrada Vitor is sandy.

All of the dangers in Caleta Vitor lie near the shore, and depths of 10.1m and over are found within 0.1 mile of the beach.

Caution.—Navigation, anchoring, and fishing are prohibited in Caleta Vitor between Punta Thomson and the coast close S of Isolote Morrito.

4.4 Cabo Lobos (18˚48'S., 70˚22'W.), about 5 miles S of Punta Pinto, is dark-colored and steep, rising to an elevation of about 745m. A spur, terminating in a hillock, projects from the S side of the cape. Several white patches of guano lie on the S side of the cape.

Punta Argolla, about 2 miles S of Cabo Lobos, is a rugged promontory which rises steeply from the sea to a height of 802m. The summit has a small peak which is very conspicuous because of its marked seaward inclination. The point is dark and has several white patches along its lower parts.

Punta Madrid is a small tongue of land projecting a short distance seaward, about 12 miles S of Punta Argolla. A small conical rock rises from the sea a short distance N of the point.

Punta Camarones (19˚13'S., 70˚18'W.), about 12 miles S of Punta Madrid, is conspicuous from the S because of some white patches on it and the islets which lie close offshore. Caleta Camarones indents the coast between Punta Camarones and Punta Norte, about 2 miles NNE. Quebrada Camarones, a ravine with high land on either side, opens S of Punta Norte and trends ENE. The beach fronting the ravine is sandy. The Rio Camarones flows down the center of the ravine but does not reach the sea.

The depths in Caleta Camarones are moderate. A depth of 10.1m lies about 1 mile NW of Punta Camarones. Landing can be made, during calm weather, close E of an islet which lies near the coast about 1.3 miles S of Punta Norte. The islet is about 7m high and can be identified by its white summit. On the coast close S of the islet, a white point is frequently visible at a considerable distance.

Anchorage.—Anchorage may be taken, in 31m, sand, about 0.6 mile N of Punta Camarones. Local knowledge is required. Small vessels can anchor, in 16.5 to 20.1m, closer inshore.

4.5 Punta Gorda (19˚19'S., 70˚19'W.), about 5.3 miles S of Punta Camarores, is a wide massive promontory. Eastward of the point the land rises to a height of about 986m. Above-water rocks extend 0.1 mile off the point.

Between Punta Gorda and Punta Pichalo, about 17 miles S, the coast consists of low broken cliffs with a few scattered rocks off it. Eastward of the coast are the high hills of the coastal range.

Caleta Chica is a small cove about 1.5 miles SE of Punta Gorda. The cove, about 0.8 mile wide at its entrance and extending about 0.5 mile inland, is well-sheltered and has excellent landing. Caleta Chica is difficult to identify from the S, however, a hill, 19.8 to 30m high, S of the cove, and Punta Gorda make good landmarks. The land at the head of the cove can be identified by its reddish color.

The depths off the center of the entrance of Caleta Chica vary between 25.6 and 29m and decrease gradually toward the head of the cove where there is 5m about 0.3 mile off. Rocks, over which the sea breaks, extend over 0.3 mile from the N entrance point of the cove. Submerged rocks lie up to 183m from the S entrance point and also border the shore of the cove. Small vessels can anchor, in depths of 9.1 to 11m, in the cove. There is a landing place E of the S entrance point and there are emergency aircraft landing strips N and S of the cove.

Punta Pisagua, about 16 miles SSE of Punta Gorda, is rocky and rises very steeply inland.

Caleta Pisagua Viejo is a small cove entered close N of Punta Pisagua which is exposed to SW winds. Quebrada de Pisagua, a ravine at the head of the cove, forms a conspicuous landmark. The beach fronting the ravine is sand. The ruins of a fishing village stand on the shores of the cove S of the beach. A rock, awash, lies near the W extremity of the shore bank which extends nearly 0.5 mile W from the N entrance point of the cove. Anchorage may be taken close offshore, in 11 to 18.3m, off the ruins of the village.

4.6 Punta Pichalo (19˚36'S., 70˚15'W.), about 2.8 miles SSW of Punta Pisagua, is a ridge which extends about 2 miles W from the general trend of the coast. There are a number of hummocks on the ridge. A conspicuous antenna stands on the ridge about 0.5 mile E of the point. A main light is shown from a tower, 4m high, standing on Punta Pichalo.

Bahia de Pisagua indents the coast between Punta Pichalo and Punta Pisagua, about 2.8 miles NE. The bay is extensive and recedes about 1.3 miles E of a line joining these two points. The shore bank, with several islets on it, follows close along the shores of the bay. Roca Cooke, Roca Carbonera, Banco Nuevo, and Roca Osorio are dangers lying close off the shore bank and not more than 0.2 mile offshore.

Depths of 44 to 104m in the entrance of the bay decrease gradually to 14.6 to 46m within 0.3 mile of the shore. Wrecks lie about 1.3 miles E by N, and 2 miles NE of Punta Pichalo.

The town of Pisagua is situated on a hillside on the SE shore of Bahia de Pisagua. A small pier, in poor condition, with a depth of 2.7m alongside, is situated on the S shore of the bay. A light is shown from the head of the pier. A pier, 70m long with a depth of 9m at its head, is situated at the head of the bay. A yellow tank and two aluminum tanks stand on the pier. It was reported that both piers were in ruins.

A monument, consisting of a tall, square, white and blue tower containing a clock, stands on a small hill behind the town and is conspicuous. A cemetery is situated about 0.5 mile ESE of Punta Pisagua. There are several tanks N of the town.

Anchorage.—Anchorage is available, in a depth of 18m, with the pier on the S shore of the bay bearing 167˚, distant 0.2 mile. Vessels may also anchor, in a depth of 66m, mud, with the same pier bearing 159˚, distant 0.5 mile. Caution should be exercised when anchoring as the bay is exposed to frequent heavy gusts of wind from SE through S to SW. The shore bank is steep-to and precautions should be taken to prevent dragging off it.

A SW heading should be maintained by means of a stern anchor. From April to August, both inclusive, two bow anchors and a stern anchor should be used.

Caleta Junin (19˚38'S., 70˚11'W.) is a cove entered between a point about 4.3 miles SE of Punta Pichalo and Punta Junin, about 1.5 miles farther S. Two sand hills rise steeply from the E shore of the cove to a height of nearly 701m. A cone rises to a height of about 32m, about 0.8 mile SE of the N entrance point. The ruins of a former nitrate shipping village are situated at the head of the cove. A conspicuous road winds back and forth along a slope to the nitrate mines beyond Alto de Junin.

Rocks and islets lie off both the N and S entrance points. Shoals extend from these points and line the shore of the cove to a distance of about 0.2 mile. A wreck, with a depth of 8.2m, lies about 0.3 mile NNE of Punta Junin.

The depths in Caleta Junin are generally moderate, diminishing from 37m in the center of the entrance to 9.1m close off the shoals which fringe the shore.

Pilotage.—Pilotage is available; the pilot boarding place is situated off Punta Junin.

Anchorage.—Anchorage can be taken, in 27.4m, about 0.5 mile N of Punta Junin. Anchorage may also be taken 0.1 to 0.2 mile farther S, in depths of 29 to 31m. The anchorage is exposed to a SW swell and vessels should moor on a SW heading.

Foul ground extends 183m from the shore at the head of the cove.

4.7 Punta Piojo (19˚42'S., 70˚10'W.), about 1.8 miles S of Punta Junin, is somewhat circular in shape. Cerro Junin rises to a height of 1,060m about 3 miles SE of Punta Piojo.

Caleta Mejillones del Norte (19˚49'S., 70˚10'W.) can be recognized easily from the N by a road which passes over the hills backing it and by Quebrada de la Aurora, a ravine a little to the S.

Anchorage.—Anchorage can be taken off the entrance of Caleta Mejillones del Norte, in 20.1 to 23.8m, sand.

The **Isla Peninsula** (19˚49'S., 70˚10'W.) lies about 8 miles S of Punta Piojo. It is the S entrance point of Caleta Mejillones del Norte and is joined to the mainland at its NE end. Several white patches characterize the Isla Peninsula. Close off the N side are a number of submerged rocks and an islet, the N extremity of which is black.

Islotes Mejillones, nearly 0.5 mile SW of the Isla Peninsula, consist of three large and several smaller rocks, all of a whitish color. The passage between them and the Isla Peninsula has depths of 10.1 to 14.6m, but there is a rock awash in the middle of the passage, and it should not be attempted.

Caleta Buena, at the foot of a bluff about 3.5 miles SSE of the Isla Peninsula, is exposed but free from danger. Several rocks lie close off the shores of the cove and a rock, awash, lies about 151m offshore. Caleta Buena was formerly a place of shipment for nitrates, but the piers have been demolished and the buildings and installations are in ruins. The nitrate slides falling from the plateau S of the cove and a prominent cemetery at its N end serve as good marks.

Pilotage.—Pilotage is available; the pilot boarding place is off the cove.

Anchorage.—Anchorage can be taken, in 18.3 to 20.1m, sand and gravel, a little over 0.3 mile offshore. The anchorage is somewhat protected from the S by the S entrance point of the cove and the holding ground is good. A vessel should be moored on a SW heading.

4.8 **Punta Ballena** (19˚54'S., 70˚09'W.), about 4.8 miles S of the Isla Peninsula, is high, steep, and rocky with no off-lying dangers. The hills near this point approach very close to the coast. Rocas Union, rocks awash, lie close offshore about 3 miles S of Punta Ballena. Punta Guaneras is located about 4 miles S of Punta Ballena. Islotes Cololue consist of two small rocks which lie close W of Punta Guaneras. Submerged rocks lie about 0.8 mile NW of these islets.

Punta Colorada, 10 miles S of Punta Ballena, can be recognized easily by its reddish color. Caleta Punta Colorada is an unsheltered cove N of the point. The cove has depths of 16.5 to 23.8m and was formerly equipped for the shipment of nitrates.

Ensenada Guanillos, about 5 miles S of Punta Colorado, affords anchorage at a prudent distance offshore, in 20.1m. Nitrates were formerly shipped from this small bay.

Punta Piedras (20˚09'S., 70˚09'W.), about 6 miles S of Punta Colorada, is a small rocky promontory which rises steeply to an elevation of 278m. The rocky heights E of the point attain an elevation of over 701m. Rocks and breakers extend more than 0.2 mile W of the point.

Iquique (20˚12'S., 70˚10'W.)

World Port Index No. 14760

4.9 Iquique is an artificial port composed of a mole linking Serrano Island with the mainland, and off the island, a breakwater 846m long. There are three berths on the inside of the breakwater, which are used as an operational mole for the numerous trawlers. These are more exposed to the swell than the four berths on the finger pier, which lies 100m to the E.

Iquique is principally a fishing port, with local factories producing fish meal, frozen fish, and canned fish. Other cargoes handled include copper concentrates, slag or ores, vegetable and soya oils, and petroleum products. The harbor is well-protected and large vessels berth alongside for the handling of cargo.

Bahia de Iquique lies between the W extremity of Peninsula Serrano and Punta Piedras, about 3 miles N. The harbor consists of Molo de Abrigo and Espigon de Atraque which extend NNE from the N side of the peninsula. Molo de Abrigo acts as a breakwater. Two offshore tanker berths lie about 0.3 mile from the E coast of the bay ENE of Espigon de Atraque.

Iquique Home Page

http://www.port-iquique.cl

Winds—Weather.—Bahia de Iquique is open to winds between the NW and NE, however, these winds seldom occur. Isla Serrano and the breakwater extending NE from it protect the harbor from the prevailing winds which blow from the S and SW.

Iquique is ordinarily entirely free from storms of any kind and strong winds are very unusual. The light breezes are generally from the SW. Mist frequently obscures the hills behind the town, particularly in the early morning and afternoon. Even the town itself may be obscured at times by a low-lying mist.

Gales off the S part of the coast of Chile cause a swell at Iquique from 2 to 4 days later. During N winds, surf enters the area between the moles sometimes necessitating the reinforcement of mooring lines.

Tides—Currents.—The mean tidal rise here is 0.6m, while the spring rise is 0.9m.

In addition to the general current that sets N, there is an inshore current of variable velocity from 0.5 to 3 knots. It sets N following the configurations of the coast and is more noticeable from Iquique northward. This current, which is scarcely noticeable in the vicinity of Punta Gruesa, sets dangerously onto Punta Cavancha and Punta Piedras.

Depths—Limitations.—Berths alongside the inner side of Molo de Abrigo have depths of 8 to 9.5m. The inner berth is used by fishing vessels. Berths alongside both sides of Espigon de Atraque have depths of 9.8m. Vessels up to 46,000 dwt, with a draft of 9.6m, have been handled.

Two offshore tanker berths, consisting of three mooring buoys, are situated at the E side of the bay. There are two submarine lines for the discharge of clean products. Fuel oil is brought into the Esso tanks. Vessels must berth in daylight, but can sail at any time. Only one tanker can berth at a time, as the lines are near each other. In both cases the vessels moor to three stern buoys, with the intake on the port side. They lie in 11m of water, heading 270˚, and both anchors streamed. The maximum permissible draft is 9.7m.

Aspect.—Cerro La Cupula, a dome-shaped mountain 905m high, lies about 3 miles E of the peninsula and in clear weather makes a good landmark for recognizing the port. A winding road, low on the N side of Cerro La Cupula, shows up well when close inshore. The summit of a sandhill S of the city shows up sharply from the N. The railroad which leads along the mountainside N of the city and both ends of its circular tunnel are conspicuous.

The city of Iquique, with the roads leading to it, is perhaps the best landmark in the area because of the mist which frequently obscures the hills. At such times as the city is obscured, all that is visible to vessels approaching from the W is the line of hills showing a sandy color and having no distinguishing marks for miles N or S. It is reported that at night, under certain conditions of clouds, the loom of the city lights may be seen up to 40 miles seaward.

Near the roadstead, the following features are conspicuous;

1. The chimney of the hospital on high ground at the back of the city, about 1.3 miles ESE of the peninsula
2. The cranes on the piers
3. A church with two small towers in the S part of the city
4. Oil tanks a short distance inland from the E side of the bay and a chimney connected therewith
5. The light standing on the peninsula
6. Three radio towers, each 18m high and marked by obstruction lights, standing close S of the disused light tower

A main light is shown from a prominent conical tower, 13m high, standing at the head of Molo de Abrigo. A lighted buoy is moored about 1.3 miles NNE of the light tower.

Pilotage.—Pilotage is compulsory if entering the port or mooring at the oil terminals. The pilot boards in the pilotage area, 0.5 mile N of Molo de Abrigo. The vessel's ETA should

be sent 72 hours, 48 hours, 24 hours, and 6 hours in advance. The port can be contacted by VHF channel 16 or 2182 kHz.

Regulations.—An IMO-adopted Traffic Separation Scheme lies in the approaches to the port and may best seen on the chart.

Anchorage.—Ocean-going vessels will find general anchorage off the port, clear of the special and prohibited anchorages, in depths of 14 to 40m, sand. Anchorage areas are best seen on the chart. Vessels are urged to consult the local authorities and the pilot before anchoring.

The quarantine anchorage lies about 0.5 mile W of the head of Molo de Abrigo. An explosives anchorage lies 0.8 mile W of the head of Molo de Abrigo.

The special (explosives) anchorage shown on the charts is reported no longer used, as there are no lighters. With prior authority from the Maritime Governor, explosives are unloaded at the berths and removed immediately under special security conditions.

Signals.—The following signals are displayed from a mast on the port captain's office:

1. One ball—Surf.
2. Two balls—Heavy surf.
3. Three balls—All bay traffic is suspended.

Caution.—Fishing vessel traffic is reported to be heavy within the port and approaches.

Two submarine pipelines extend about 0.4 mile W from a point on the E shore of the bay, 1.3 miles NE of the head of Molo de Abrigo.

Anchorage and prohibited areas, the limits of which are shown on the chart, lie N of the port and in the vicinity of the naval pier which is situated about 0.5 mile E of Espigon de Atrague.

Several dangerous wrecks lie in the bay E of Espigon de Atrague and may best be seen on the chart.

A patch, with a depth of 12.7m, lies at the E end of the inbound traffic lane, about 0.6 mile WNW of the head of Molo de Abrigo.

A prohibited area, the limits of which are shown on the chart, lies close W of Molo de Abrigo and the peninsula.

Iquique to Tocopilla

4.10 Caleta Cavancha recedes about 0.5 mile eastward, 1.3 miles S of Peninsula Serrano. A small pier, 35m long, and a canning factory, are situated on the S side of the cove. The S part of the town of Iquique backs the NE shores of Caleta Cavancha. Some abandoned submarine cables exist in Caleta Cavancha. Punta Cavancha, the S entrance point, is low and rocky. An inshore current sets dangerously onto Punta Cavancha.

A sandy beach, interrupted by a rocky patch about 0.3 mile wide, lies between Punta Cavancha and a point about 3 miles S. Farther inland there is a ridge of yellow sand, the N summit of which is 270m high.

It was reported that a depth of 6.2m was found to lie about 5.3 miles WSW of Punta Cavancha.

Caution.—An anchoring and prohibited fishing area has been established about 0.4 mile SE of Punta Cavancha.

4.11 Caleta Molle (20˚18'S., 70˚08'W.), about 4 miles SSE of Caleta Cavancha, may be identified by a winding road which descends the hill behind it, the high sand dunes along the N shore of the cove, and the yellow sand beach at its head. Rocas Miami extend NW from the S entrance point of the cove and are marked by kelp. Breakers are sometimes seen over these rocks. A former whaling station is situated in the cove. A ramp and a pier, 53m long, are situated near two tanks and a small oil refinery on the S side of the cove. A 2.7m shoal lies NW of the pier. The cove should not be entered without local knowledge.

Punta Gruesa (20˚21'S., 70˚11'W.) lies about 5 miles SSW of Caleta Molle. The coast between is fronted by rocks and shoal water to a distance of nearly 1 mile offshore. The point is low and cliffy, with three white patches on its N side. It forms the end of a spur extending from Morro Tarapaca, a mountain about 4 miles ENE. Rocas Los Gemelos consist of two sunken rocks which lie at the outer extremity of foul ground which extends about 1.5 miles NW from the N end of Punta Gruesa. The SW rock has a depth of 4.9m over it. Three dark-colored above-water rocks lie about 0.3 mile NE of Punta Gruesa, which should be given a berth of at least 3 miles due to heavy swells and irregular currents. A main light is shown from the point.

Caleta Toyos, about 3 miles SE of Punta Gruesa, may be recognized by the settlement and small pier at its head. Punta Sargazos, the N entrance point, is surrounded by kelp to a distance of about 151m offshore. Rocks lie nearly 0.2 mile off Punta Rompientes, the S entrance point, which should be given a wide berth. Small vessels may anchor close offshore, with a bottom of sand and shells. Local knowledge is required.

Punta Sarmenia (20˚27'S., 70˚10'W.) is located about 7 miles S of Punta Gruesa. Caleta Sarmenia and Caleta Ligate are small coves which lie N and S, respectively, of Punta Sarmenia. Cerro Oyarbide rises about 5 miles ENE of Punta Sarmenia. Four radio masts, marked by red lights, stand in the vicinity of Caleta Sarmenia.

Punta Chucumata lies about 3.5 miles SSW of Punta Sarmenia. Submerged rocks and foul ground fringe the point to a distance of 0.5 mile offshore. Caleta Chucumata, close NE of the point, affords anchorage, in 12.8 to 18.3m, slightly sheltered from the S. Nitrates were formerly shipped from the cove, but at present there are no installations of any kind. Islote Gaviotas lies about 0.5 mile offshore, about 2.5 miles S of Punta Chucumata. An aeronautical radiobeacon is situated about 2 miles SSE of Punta Chucumata.

Caution.—An air and naval exercise area, where navigation is restricted, is charted in the area of Islote Gaviotas, extending about 4 miles N and S, and 2 to 3 miles offshore.

4.12 Caleta Patillos (20˚44'S., 70˚12'W.) is situated about 12 miles S of Punta Chucumata. The cove recedes about 1 mile E between Punta Cotitira and Punta Patillos, about 1.5 miles S. Rocks, with depths of less than 1.8m, lie within 0.3 mile of Punta Cotitira, and a submerged rock lies about 0.2 mile offshore, a little over 0.3 mile SE of the point. Bajos de Cotitira, consisting of a number of submerged rocks and rocks awash, lie about 0.3 mile offshore, 0.8 mile NW of Punta Cotitira.

Islotes Patillos consist of three islets, one of which lies about 0.1 mile W of Punta Patillos and the others about 0.4 mile SW

of the point, and a little over 0.3 mile offshore. There is a small islet a little over 0.5 mile S of Punta Patillos. Islotes Patillos are whitish in color and visible from a considerable distance seaward. A light is shown from Punta Patillos.

Winds—Weather.—A vessel calling here in the month of July reported that a moderate swell was felt in an area SW of Punta Cotitira, but little current or swell was found off the bay's NE shore. The vessel also reported finding a slight to moderate swell at the pier.

Depths—Limitations.—Entrance to the port is from a cove, 1 mile wide, with minimum depths 200m offshore of around 18m. Berthing is done during daylight hours only. Unberthing can be done 24 hours, except that vessels longer than 230m can unberth only during daylight hours.

A conveyor pier, 91m long with mooring buoys at the head in depths of 18m, is situated about 0.5 mile ENE of Punta Patillos. Generally, the berth, used by vessels loading salt, can accommodate vessels up to 50,000 dwt, with a maximum length of 225m and a maximum draft of 12.2m.

Aspect.—A prominent monument stands about 0.5 mile NE of the pier. The salt conveyor structure on the pier is conspicuous. Four range beacons stand on the shore close SW of the pier. A main light is shown from Punta Patillos. The conspicuous lights of the salt loading terminal can be seen at night up to 20 miles seaward.

Pilotage.—Pilotage is compulsory; the pilot comes from Iquique where notice of arrival should be sent. The services of a tug may also be obtained by prior arrangement with Iquique. The pilot boards about 0.8 mile ENE of the pier and may be contacted by VHF.

Anchorage.—Good anchorage may be taken about 0.2 mile from the S shore, in depths of 22 to 24m, or 0.4 mile offshore, in depths of 24 to 29m.

4.13 Punta Patache (20˚49'S., 70˚12'W.), the S entrance point of Caleta Patache, lies about 4 miles S of Punta Patillos. It is low, rugged, and salient. An islet lies about 0.3 mile W of the point. The coast in this area is backed by the steep slopes of Alturas de Oyarvide, a plateau 3 miles E of Punta Patillos. Monte Carrasco, conical in shape, rises in a position about 10 miles SE of Punta Patache.

Caleta Chanavaya (20˚53'S., 70˚08'W.), about 6 miles SE of Punta Patache, affords anchorage to small vessels, in 31m, about 0.5 mile NW of its S entrance point. There are some brightly colored houses on the shore of the cove. A landing place, sheltered by four islets and several rocks, is situated on the S shore of the cove. Lighters can load safely at the landing place.

Caleta Pabellon de Pica, close S of Caleta Chanavaya, is entered between Punta Colina, the N entrance point, and a point about 0.5 mile S. A guano-covered hill, nearly 15.2m high, rises close E of Punta Colina. A reef, with above-water rocks on it, extends about 0.2 mile from Punta Colina. Cerro Pabellon de Pica, about 0.3 mile E of the S entrance point, rises to a height of 318m. The mountain is conical in shape, and being covered with guano, presents a strong contrast with the barren, sun-burnt brown of the surrounding hills.

Depths of 21.9 to 25.6m in the entrance of Caleta Pabellon de Pica decrease gradually toward the head of the cove. An exposed anchorage for large vessels is in 44m, about 0.4 mile SW of the S entrance point.

Quebrada de Pica is located about 5 miles SSW of Cerro Pabellon de Pica. This ravine consists of a narrow gorge enclosed by high hills which fall almost vertically to the sea. Above-water rocks fringe the coast between these two features. The rocks are whitened by guano and have the appearance of boats under sail.

Caleta Pescadores, about 1.5 miles N of Punta Lobos, is entered between Punta Piojo and Punta del Faro, about 0.8 mile S. Rocks and reefs fringe both entrance points and the shores N and S of the cove for a distance of about 0.1 mile off.

Anchorage.—The best anchorage in Caleta Pescadores is about 0.5 mile N of Punta del Faro, about 0.2 mile offshore, in a depth of 35m, sand.

Caleta Lobos indents the coast about midway between Punta del Faro and Punta Lobos, about 0.8 mile S. Rocks fringe each of these points to a distance of 0.2 mile offshore and also line the S shore of the cove for the same distance off. A rock, which dries, and a submerged rock lie about 0.3 and 0.2 mile, respectively, NW of the head of the pier. A submerged rock lies close NW of the pier head.

Anchorage.—Anchorage for working cargo is obtained, in depths of 16 to 22m, NW of Punta Lobos; local knowledge is required.

Small vessels can anchor close offshore, in depths of 33 to 37m, rock, with Islote Pajaros obscured by Punta Lobos.

4.14 Punta Lobos (21˚01'S., 70˚10'W.) is steep with several hummocks on its outer end. About 2.5 miles NE of the point, the land rises to a height of 900m. The point can be easily recognized for a long distance by Islotes Pajaros, two white, steep-to islets, lying about 1.5 miles SE and 0.5 mile offshore. A disused light structure stands about 0.8 mile NNE of the point. Rocks fringe the point to a distance of about 0.2 mile. A line of breakers, which should be given a wide berth, lies about 0.6 mile SW of the point.

Punta Chomache lies about 7 miles SSE of Punta Lobos. It can be recognized by patches of guano on its side and by a small fishing settlement 1 mile N. Farallones de Chomaches consist of a group of rocks, awash, on a reef which extends over 1 mile W from Punta Chomache. The outer part of the reef is marked by breakers. Bahia Chomache is between these two points. A light is shown from Punta Chomache.

Caution.—The waters in the vicinity of Punta Chomache are dangerous and should not be approached at night or in low visibility.

Punta Guanillo del Norte is located about 5.5 miles SSE of Punta Chomache. Rocks and breakers extend up to 1 mile from the coast between these two points. Punta Guanillo del Norte can be identified for a considerable distance by a large white patch on its seaward side. The point is steep-to and there is a large amount of guano on or near it.

Caleta Guanillo del Norte is entered close N of a point about 0.5 mile N of Punta Guanillo del Norte. Monte de la Cruz is a small conical hill close E of the S entrance point, and Monte Boca del Diablo is a hill on the N side of the cove. A village is situated close NE of Monte de la Cruz. A small pier is situated about 0.2 mile N of the S entrance point, and another pier, where guano is loaded, is situated about 0.2 mile SE of Punta

Guanillo del Norte. Vessels bound for Caleta Guanillo del Norte should endeavor to make the land S of the cove. Local knowledge is required.

Anchorage.—Small vessels may find anchorage in Caleta Guanillo del Norte, about 0.5 mile WNW of the S entrance point, in 25.6 to 27.4m, sand and rock. As a heavy swell occasionally sets into the cove, anchorage farther in is not recommended. Vessels may anchor about 0.4 mile SW of the pier, SE of Punta Guanillo del Norte, in 33 to 46m, sand.

4.15 Punta Blanca (21˚15'S., 70˚05'W.) lies about 3 miles S of Punta Guanillo del Norte and can be easily identified for a considerable distance by a white patch on its S side. Rocks and shoals lie up to 0.5 mile off the point. Cerro Chipana, a 1,285m high mountain, stands about 2.5 miles inland, about 3.5 miles SE of Punta Blanca.

Caleta Chipana is entered between Punta Falsa Chipana, on which a light is shown, about 5.5 miles S of Punta Blanca, and Punta Chipana, a little over 1 mile NE. Rocks lie 0.1 mile off Punta Falsa Chipana. Foul ground extends about 0.5 mile NW of Punta Chipana, and 0.2 to 0.4 mile from the shore of the cove. Farallones de Chipana consist of two above-water rocks and a rock awash which lie between 0.8 mile and 1 mile NNW of Punta Chipana. A rock, awash, lies about 1 mile NW of Punta Chipana.

Punta Chileno lies about 8.5 miles S of Punta Falsa Chipana. The Rio Loa discharges into the head of Caleta Loa, which recedes about 2 miles E between the two above points. The Rio Loa is the principal river of northern Chile. During summer, the Rio Loa is only a shallow stream which flows within 0.3 mile of the coast, where it spreads and flows over or filters through the beach. The river does not make any channel or throw up any banks. About 0.5 mile inland on the N side of the river may be seen the ruins of a village.

The best landmark for recognizing the Rio Loa is the ravine through which it flows. The hills on the N side of the river are high and irregular, while those on the S side are quite low.

Punta Lautaro (21˚32'S., 70˚06'W.), about 4 miles S of Punta Chileno, is 70m high, rugged, and has a white summit. Caleta Lautaro is just N of the point. Depths of 12.8 to 16.5m in the entrance of the cove decrease gradually to a sand beach at the head of the cove.

Anchorage.—Anchorage, suitable for small coasting vessels, is obtainable, in a depth of about 24m, with the N extremity of Punta Lautero bearing 188˚, distant 0.1 mile, but local knowledge is required.

Caleta Punta Arenas lies close N of Punta Arenas and about 5 miles SSW of Punta Lautaro. The S and NE shores of the cove are bordered by shoal water to a distance of about 0.2 mile offshore.

Anchorage.—Anchorage may be taken, in 21.9m, fine sand, about 0.3 mile offshore in a position about 0.8 mile NE of Punta Arenas.

4.16 Punta Arenas (21˚38'S., 70˚09'W.) is low and sandy. It is fringed by rocks which extend to about 0.2 mile offshore. A fishing village is situated on the S side of the point. Cerro Mogote rises to a height of 998m, about 3 miles E of the point.

Cabo Paquica, about 16 miles S of Punta Arenas, extends about 1 mile W from the general trend of the coast. It is a salient promontory, the N point of which is covered with guano. An islet lies about 0.5 mile W of the point. Roca Tortuga, a sunken rock, lies about 1 mile S of Cabo Paquica and about 0.5 mile offshore. A second rock lies roughly halfway between the rock and the point. Cerro Tolar, about 6 miles ESE of Cabo Paquica, is a conical mountain.

Rocks lie up to 0.5 mile off Punta Mal Paso, about 4.3 miles S of Cabo Paquica.

Punta Algodonales lies about 12 miles SSW of Cabo Paquica. Bahia Algodonales is entered between the point and Roca Blanca, a small white islet located about 1.8 miles NE. Roca Duendes, with 3.3m over it and surrounded by reefs, lies about 0.3 mile offshore. It is the outermost of several rocks which lie NW of Roca Blanca. Islote Blanco is the largest of a group of islets and rocks which extend about 0.4 mile W and NW from Punta Algodonales. A main light is shown from a tower, 8m high, standing on Islote Blanco.

Tocopilla (22˚05'S., 70˚14'W.)

World Port Index No. 14720

4.17 Tocopilla lies at the SE end of Bahia Algodonales. The port was once a major nitrates port. It is now used mainly for tanker traffic, with occasional bulk cargo being shipped.

Winds—Weather.—The port of Tocopilla is well-protected from the prevailing S and SW winds, but it is exposed to strong N and NW winds during the winter months. Frequent fogs occur from June to September. When fogs are low, it is impossible to determine accurately a vessel's position offshore and caution must be exercised when calling at the port.

Tides—Currents.—The mean tidal rise here is 0.9m, while the spring rise is 1.2m. Currents setting ENE at velocities up to 3 knots may be experienced in Bahia Algodonales. During storms or when the wind is from the E, the currents change and set S or SW and are strong, particularly during solstices.

Depths—Limitations.—Vessels anchor or moor ; cargo is worked by barges. Three mooring buoys are available.

The oil terminal has a pier length of 150m with a depth alongside of 13.7m. There are mooring buoys at either end of the pier. Vessels up to 250m in length may berth here.

Two offshore petroleum berths are available within the bay. Tankers are moored with both anchors down and lines to stern buoys. Tankers up to 11m draft can be handled.

A terminal for unloading coal, consisting of a jetty 240m long, is situated in the W part of the port. The jetty has a T-head, 80m long, with depths of 19m alongside. Vessels up to 80,000 dwt and 13.5m draft can be handled at the terminal with the use of several mooring buoys. Several piers which extend from the shores of the bay are used by barges for handling cargo and for landing passengers. Lights are shown from the heads of several of the piers and some are lighted throughout their entire length.

Vessels loading bulk nitrate moor offshore on a heading of about 265˚, port side to shore, using the starboard anchor and making bow and stern lines fast to mooring buoys. The nitrate loader can reach all hatches without shifting the vessel. Mechanical trimmers are available. A maximum draft of 10.9m can

be accommodated at the mooring berth. Only one vessel can load at a time at a rate of 1,000 tons per hour.

Aspect.—The vicinity of the port may be recognized by Quebrada de Tocopilla, a ravine which cuts through the coastal range and descends to the sea from the high land behind the city. About 9 miles NNE of Punta Algodonales is a group of mountains, two of which are conspicuous landmarks because their summits terminate in bluffs. Southward of Quebrada de Tocopilla is Monte Culillaca which has a broad light-colored band that is visible many miles at sea. A wide dark-colored band marks a place on the coast about 1 mile S of Punta Algodonales.

The light shown from Islote Blanco is difficult to identify by ships approaching from the S because of the factory on the point and the lights in the town.

To vessels approaching from the S, the smoke of the smelting works will be seen apparently seaward of the land; Punta Algodonales does not appear until later. At night the reflection of the lights of the town is reported to be visible 30 miles under favorable conditions. The lights of the city can ordinarily be seen 10 miles and the lights of the smelting works can be seen 15 miles.

A large power station, with a number of tall chimneys, is situated W of the city and is perhaps the best landmark on the bay. The oil tanks on Punta Algodonales serve as additional marks for identifying the place. A cemetery, about 1 mile NE of the town, is conspicuous from the offing. Several tanks, marked at night by obstruction lights, are situated on the hill behind the town. The aluminum silos, which are also marked by lights, situated at the nitrate loading berth, provide an excellent landmark.

Pilotage.—Pilotage is compulsory, both for the mechanical plant, the oil terminal, and mooring buoys. Pilots will board at any hour, about 1 mile NNE of the entrance moles. Berthing is permitted only during daylight hours. Vessels can call port control on 500 or 2182 kHz, or on VHF channel 9, 14, or 16.

Anchorage.—Anchorage may be taken in any part of the bay, clear of the mooring buoys, in 14.6 to 46m sand, mud, and shells. The recommended anchorage is in depths of 36 to 40m, sand, clay, and rock, with the headland on which the nitrate loader stands bearing 195˚, and about 0.8 mile distant. Vessels which are to remain in the port more than one day are advised to moor, however, if vessels should remain at anchor they should use two anchors and lie with their bows in a W direction. Vessels are assigned anchorage and mooring berths by the port authorities.

Caution.—Several wrecks lie in the vicinity of the port and may best be seen on the chart.

Tocopilla to Mejillones

4.18 Between Punta Algodonales and Punta Atala, about 11 miles S, the coast is high with a number of sandy coves which are separated by rocky points. The coast is backed by a range of mountains from 610 to 1,557m high. The outermost dangers consist of rocks which lie from 0.5 to 0.8 mile off some of the points.

The working lights of mines, situated close inland of Punta Blanca and about 3 miles N of that point, are conspicuous. The lights run vertically up a steep hill.

Punta Blanca (22˚10'S., 70˚14'W.) is rocky. Three sunken rocks lie about 0.5 mile off the point. Caleta Blanca, close N of Punta Blanca, is a place where vessels anchor occasionally to load copper ore. Punta Agua Dulce, about 5 miles S of Punta Blanca, is the W extremity of a chain of hills. It is of medium height and cliffy.

Between Punta Atala (22˚17'S., 70˚15'W.) and Punta Yayes, about 31 miles S, there are a number of rocky points, behind which lie high barren hills. Rocks and islets front much of this part of the coast up to about 1 mile offshore.

Punta Copaca lies about 2.5 miles S of Punta Ataia, the coast between being foul. The point is rocky with some knolls at its extremity. The coast between Punta Copaca and Punta Ampa, about 2 miles S, is generally foul and is fronted by shoals and submerged rocks to a distance of 0.7 mile. Punta Ampa is low, rocky, and fringed with reefs which extend 0.7 mile offshore.

Punta Guanillo del Sur (22˚23'S., 70˚16'W.) has several rocks, above-water and awash, about 228m SW of it. Caleta Guanillo del Sur is entered between Punta Guanillo del Sur and a point nearly 1 mile S. Islotes Negros, which are mostly white with guano, and some submerged rocks lie up to 137m off the S entrance point of the cove. A rock, awash, lies about 0.3 mile NNE of the S entrance point. Some copper mines are situated about 3 miles inland; a prominent zig-zag road leading up to one of them provides a good landmark.

Punta Bandurria del Norte lies about 0.5 mile SW of Caleta Guanillo del Sur. Islotes Blancos consist of 5 islets which lie about 0.2 mile offshore, about 0.3 mile S of Punta Bandurria del Norte. Caleta Chinos is entered close S of Islotes Blancos and is visited by fishing vessels. A reef extends about 0.8 mile seaward from Punta Chinos, the S entrance point of the cove.

4.19 **Punta Grande** (22˚28'S., 70˚16'W.) is rocky and crowned with several flat-topped hills. Reefs extend 0.5 mile seaward from the point.

Caleta Gatico recedes about 0.8 mile E between Punta Grande and Punta Gatico, about 3 miles SSE. Rocks extend as much as 0.1 mile from the N side of Punta Gatico and about 91m from the W and S sides of the point. A good landmark for approaching the cove is a two-story white house with a red roof, about 0.8 mile NE of Punta Gatico. There is good anchorage, in 33m, sand, about 0.3 mile W of the head of the cove. Closer in and more to the S the bottom is rocky and unsuitable for anchoring. Heavy swells sometimes set into the cove very suddenly. A village at the head of the cove is reported to be abandoned. Some wharves, in ruins, extend up to 0.8 mile off the coast of the cove.

Vessels approaching Caleta Gatico from the N have frequently mistaken Caleta Guanillo del Sur for this cove. One feature by which the coves may be distinguished is that the rocks off Punta Guanillo del Sur are white from guano, while the rocks off Punta Gatico have a dark appearance.

Punta Guacache, about 1 mile S of Punta Gatico, has islets and rocks about 0.2 mile off it. Caleta Cochinos is a small cove with a sandy beach between these two points.

Punta Cobija (22˚33'S., 70˚17'W.) forms the W end of a rocky peninsula. It attains a height of 33m a short distance inland. Close W and S of Punta Cobija is a group of rocks, one of which is called Roca Blanca. This flat rock is white and

stands out clearly against the background of the black rocks on the shore behind it.

Rada de Cobija lies between Punta Cobija and Punta Guacache. The roadstead is about 2 miles wide at the entrance, and the shores are rocky and foul. Foul ground extends up to 0.2 mile from the S shore of the cove, with depths of 9 to 14m close outside it. The hills rise directly from the coast and form an almost unbroken ridge 610 to 914m high, with no sufficiently marked feature to indicate the position of the ruins of an abandoned port at their base. The ruins of the former port can be seen from a distance of 5 miles and form a landmark in the approach to Rada de Cobija. Roca Blanca would be a good mark, but there is a similar rock some miles to the N.

It is reported (1990) that a pier, which was situated 914m E of Punta Cobija, has been destroyed and that landing is impossible.

Anchorage.—The best anchorage is in the S part of the bay, in about 18.3 to 23.8m, sand, about 0.5 mile ENE of Punta Cobija. There is good anchorage for large vessels, in 35m, about 0.6 mile NE of Punta Cobija.

4.20 **Punta Guasilla** (22˚34'S., 70˚17'W.) is conspicuous because of two small flat-topped islets which lie 1 mile off it. The coast between Punta Guasilla and Punta Tamira, about 2 miles S, is foul to a distance of 1 mile offshore. An islet lies about 0.1 mile S of Punta Tamira. Punta Chungungo, about 2 miles S of Punta Tamira, is rough, steep, and of a blackish color.

Punta Tames (22˚40'S., 70˚20'W.) is rugged and one of the most conspicuous points along this section of coast. Rocks fringe the point to 91m off. Islotes Blanco lies nearly 0.5 mile NE of the W end of the point and about 91m offshore. Caleta Tames recedes nearly 1 mile E between Punta Tames and Punta Chungungo.

Anchorage.—Anchorage, with good holding ground, can be taken, in a depth of 23m, shells, 0.2 to 0.3 mile offshore.

Punta Guaque, about 2 miles S of Punta Tames, is low. Islote Negro lies about 0.2 mile off the point. Caleta Michilla lies between Punta Guaque and Punta Michilla, about 3 miles S. The cove is about 0.8 mile wide at the entrance and recedes nearly 0.5 mile eastward. Depths of 21.9m in the entrance decrease to 12.8m about 0.3 mile from the shore. Small vessels can find good anchorage about 0.3 mile N or NW of the S entrance point, in 21.9m, sand. There is a small settlement and the ruins of a pier, on the S shore of the cove.

Punta Gualaguala (22˚46'S., 70˚20'W.) is high, rocky, and somewhat conspicuous because of the low black hills with which it is crowned. Rocks extend a short distance off the point. Caleta Gualaguala lies between Punta Michilla and Punta Gualaguala, and has a small pier for the shipment of ore. There is partly-sheltered anchorage, with fair holding ground, from 0.5 to 0.8 mile WNW of the pier. A small settlement is situated near the pier.

4.21 **Punta Hornos** (22˚55'S., 70˚18'W.) lies about 9.5 miles S of Punta Gualaguala. Above and below-water rocks lie up to 0.2 mile W and nearly 0.5 mile SW of Punta Hornos. Caleta Playa del Horno, N of Punta Hornos, has a sandy beach on its S side where landing can be made at all times. A rock, awash at low water, lies about 183m N of the beach. A rock, surrounded by a drying reef, lies about 0.1 mile off the S entrance point of the cove. Good anchorage may be taken in the cove between 0.8 and 1 mile N of Punta Hornos; in depths of 25m; however, depths shallower than charted have been reported in the vicinity of the anchorage.

Punta Chacaya lies about 3 miles SSW of Punta Hornos. Patches of foul ground lie from 0.5 to 1 mile offshore between these two points. It is reported that a conspicuous white pyramid stands about 2.3 miles SSW of Punta Chacaya. Caleta Chacaya is a small cove which is entered N of Punta Chacaya. Small vessels can take anchorage about 0.3 mile NW of Punta Chacaya; in a depth of 29m, but it was reported that shoaling had taken place in the cove.

Punta Angamos (23˚01'S., 70˚31'W.) lies about 11 miles SW of Punta Chacaya. The point is a remarkable headland about 220m high and extends N. It is entirely covered with guano, which gives it the appearance of a chalky cliff. Roca Abtao is a detached rock a little over 0.8 mile NW of Punta Angamos. This rock has about 2.4m of water over it and usually is unmarked by breakers. A main light is shown from the point.

Bahia Mejillones (23˚03'S., 70˚27'W.) is entered between Punta Chacaya and Punta Angamos.

The approaches to the bay are clearly depicted by radar from a distance of about 30 miles. Punta Angamos, Punta Chacaya, Morro Mejillones, and Tetas de Mejillones serve as excellent radar landmarks.

Morro Mejillones has the appearance of a truncated cone and stands conspicuously above the surrounding heights. In clear weather this is the best landmark in the vicinity, but as the tops of the hills on this coast are frequently covered with heavy clouds, Punta Angamos is a surer mark. Punta Angamos cannot be mistaken. Besides a chalky appearance, it is the N extremity of the peninsula, and the land eastward recedes sharply S.

Tetas de Mejillones consist of two peaks, 325 and 330m high, on the W shore of the bay about 1.5 miles S of Punta Angamos. A conspicuous group of houses is situated on the N slope of Morro Mejillones. The lights of the buildings are clearly visible at night for a distance of 15 miles between the bearings of 090˚ and 215˚. An unusual phenomenon is the occurrence of large and small areas of discolored water, known as "aguaje." These give the appearance of shoals and have been observed in the bay. They are of a coffee, red, or yellow color and are caused by the presence of great quantities of marine growth.

Mejillones (23˚06'S., 70˚28'W.)

World Port Index No. 14670

4.22 Mejillones lies on the S shore of Bahia Mejillones del Sur, which is said to be one of the best natural harbors on the W coast of South America. The port consists of passenger berths (Muelle Fiscal), one fishing vessel berth, and one terminal with three mooring buoys for the discharge of ammonia. Large areas of plankton are a local phenomenon. Between six and 12 explosives-carrying ships berth here a year.

Winds—Weather.—Light N winds may start after midnight and continue until about noon. Southwest winds start about

noon and last until evening. Although these winds descend from the highlands and are usually quite strong, they do not interfere with the traffic in the port. Fog is rare, but sometimes occurs between June and September. As the bay is sheltered from the prevailing SW winds, storms do not generally enter the bay. Offshore storms produce a swell in Bahia Mejillones del Sur that, although not interfering with the ships at anchor, is felt close inshore and alongside the piers.

Depths—Limitations.—Several piers, two of which are in use, are situated in the S part of the harbor. The piers are used by small craft and lighters. There is a small fishing wharf, 53m long, with a depth alongside of 3m.

A berth for the discharge of ammonia lies about 3.8 miles E of Cerro San Luciano and 0.3 mile offshore. The berth consists of a platform, two dolphins, and three mooring buoys. Vessels of up to 15,000 dwt and 180m in length can be handled.

A berth for the discharge of explosives and inflammable materials is situated about 2.5 miles ENE of Cerro San Luciano. Vessels anchor at the berth, in a depth of 20m. A shoal patch, with a depth of 4.7m, lies close E of the berth.

A chemical and grain pier, consisting of a 36m long T-head and two mooring dolphins, stands E of the city. Vessels up to 71,000 gross tons, with a maximum length of 230m and a maximum draft of 14.4m, can be accommodated.

An offshore floating pipeline, marked by a buoy, is located E of the piers and can accommodate vessels up to 30,000 gross tons, with a maximum length of 183m and a maximum draft of 10.7m.

Aspect.—Cerro San Luciano, a prominent hill that rises to an elevation of 522m, stands in the SW corner of the bay, about 4.5 miles SSE of Punta Angamos.

An aeronautical radiobeacon is situated close S of the port.

See the description of Bahia Mejillones in paragraph 4.21.

Pilotage.—Pilotage is compulsory for all vessels. However, as there is no resident pilot in Mejillones, a pilot is usually sent from Antofagasta. The pilot boards about 1.5 miles NE of the Mejillones del Sur Light.

The vessel's ETA should be given daily to Antofagasta Radio starting 5 days in advance, clearly indicating arrival at Mejillones. The port captain at Mejillones operates a 24-hour listening watch on VHF channel 16.

Anchorage.—Anchorage can be taken within about 0.8 mile of the shore in any part of the bay, noting that depths decrease rapidly towards the shore. A recommended position is in the SW corner of the bay, in depths of 20 to 27m, about 1 mile ENE of Cerro San Luciano, but vessels prefer to anchor E of this position and N of the piers.

Caution.—Pontoons, for shellfish cultivation, are moored close offshore within the bay. Two wrecks, best seen on the chart, lie close off the town.

Mejillones to Antofagasta

4.23 Peninsula Mejillones del Sur is the high landmass W of Bahia Mejillones del Sur. Its E side extends from Punta Angamos to the SW extremity of the bay. Its W side trends about 7 miles SW to a position on the coast about 1.5 miles SE of Punta Loberia.

From Punta Angamos the coast trends about 5 miles SW to Punta Baja, which is low, rocky, and surrounded by submerged rocks to a distance of nearly 0.5 mile. Rocks and reefs extend from 0.3 to nearly 0.5 mile offshore between these points. Punta Loberia lies about 1.5 miles S of and is similar to Punta Baja. A reef, with a rock awash and submerged rocks, extends nearly 1 mile W from Punta Loberia.

Punta Jorgino lies about 8.5 miles S of Punta Loberia. The point is rocky and rounded. It lies at the foot of Morro Jorgino which is high, rugged, and forms the N end of a tableland.

Banco Lagartos extends about 0.5 mile seaward from Punta Lagartos (23˚22'S., 70˚37'W.). Islote Lagartos lies at about the center of the bank. The islet, 4.9 to 5.8m high, is rock covered with white shells and can be recognized for 3 miles. Rocks extend some distance NW and S from the islet. A reef extends nearly 0.5 mile NNW from the islet and terminates in an above-water rock. The boilers of a wrecked steamer lie on this reef and are always visible.

Roca Esmeralda, a submerged rock over which the sea breaks violently, is charted nearly 3 miles WNW of Punta Lagartos. As the position of the rock is doubtful, caution must be observed to give it a wide berth. The light on Punta Tetas is obscured over Roca Esmeralda.

A rock lies close off and a reef extends nearly 0.5 mile seaward from an unnamed point about 2.5 miles S of Punta Lagartos. From this point the coast trends about 1 mile SE to the N entrance point of Caleta Constitucion. Rocks extend 0.5 mile seaward between these two points.

The coast recedes about 0.8 mile E between the N entrance point of Caleta Constitucion and an unnamed point about 3 miles S. Isla Santa Maria lies about midway between these two points. Reefs extend a little over 0.5 mile SSW from the S side of the island and up to 0.3 mile from all other sides.

4.24 Caleta Constitucion (23˚25'S., 70˚36'W.) is entered N of Isla Santa Maria and lies NE of the island. The entrance between the reefs, which extend N from the island and those which extend about 0.3 mile S from the N entrance point, is about 0.5 mile wide and has a least depth of 13.7m. A channel, about 180m wide at its narrowest part and with a depth of 11.9m, trends S between Isla Santa Maria and the mainland and connects Caleta Constitucion and Caleta Errazuriz. This channel is used only by small vessels with local knowledge.

Anchorage.—Small vessels can take sheltered anchorage in the cove, between the NE side of Isla Santa Maria and the mainland NE. The best anchorage is about 0.5 mile ENE of the N end of the island, in 11 to 18.3m, mud. Farther out the holding ground is poor. The land breeze, called "paracas," is sometimes strong, especially at night.

Caleta Errazuriz is entered S of Isla Santa Maria and lies S of the island. The channel between the reefs, which extend SSW from the island and those which extend about 0.3 mile N from the W entrance point of the cove, is about 0.3 mile wide and has depths over 27.4m.

Peninsula Moreno is the high land mass S of Caleta Errazuriz. Cerro Moreno, the dominant peak in this region, lies about 3 miles ESE of Caleta Errazuriz in the N part of the peninsula. The mountain is inclined on its S side, but to the N it ends abruptly over a barren plain. It is dark in color, lacks vegetation of any kind, and is split by a ravine on its W side.

Punta Tetas (23˚31'S., 70˚38'W.) is the SW extremity of Peninsula Moreno. The point is of moderate height, rocky, and arid. Two hillocks on the point, aligned NE and SW, are conspicuous and facilitate the recognition of the point from a long distance. Punta Tetas is steep-to and free of off-lying dangers. A main light is shown from the point.

Anchorage.—Anchorage is obtainable, in a depth of 46m with Punta Tetas Light bearing 303˚, distant 1.2 miles. This berth is usually used by the lighthouse tender; there is a landing place nearby. Better shelter is obtained by anchoring 0.5 mile ENE of the light, over a sandy bottom.

The coast between Punta Tetas and Antofagasta, about 14 miles ESE, recedes about 6.5 miles NE. A small bight recedes about 1.3 miles N between Punta Tetas and Punta Jorge, about 4 miles E. Islote Lobos lies close offshore in the N part of this bight, in a position about 2 miles ENE of the S extremity of Punta Tetas. Roca Blanca lies close offshore, about 2.5 miles E of Punta Tetas.

Bahia Moreno recedes about 4.5 miles N between Punta Jorge and Isla Guaman, about 7.5 miles ESE. Except for a sandy beach at the head of the bay, the shores are formed by rocky cliffs.

Caleta Abtao (23˚31'S., 70˚32'W.) indents the W shore of Bahia Moreno. The cove is well-sheltered and has little or no swell. Small vessels can take anchorage about 0.3 mile N of the S entrance point, in about 17m. There is a landing place at a small wooden pier.

The airport for Antofagasta is situated on the NE side of Bahia Moreno. Several conspicuous lights are shown from there.

La Loberia, a group of above-water rocks, and La Portada, an above-water rock, lie close offshore along the NE shore of Bahia Moreno. The highest part of this coast is abreast La Loberia, where it rises to about 19.8m.

Isla Guaman (23˚33'S., 70˚25'W.) is about 21.9m high and white. Rocks extend nearly 0.1 mile NW from the NW end of the island and shoals extend about 91m off all other sides of the island. It is connected to the mainland by a causeway. A beacon, 6m high, equipped with a can-shaped topmark with red and white bands, stands on Isla Guaman.

4.25 Caleta La Chimba lies NE of Isla Guaman and is protected from the S by a causeway joining the island to the mainland. There are depths of 25.6m in the entrance, which decrease to about 9.1m about 0.2 mile from the head of the cove. Above-water rocks lie about 0.3 mile NE of Isla Guaman. The entrance of the cove, between these rocks and the shoals extending from Isla Guaman, is about 0.2 mile wide. Small vessels anchor about 0.2 mile NE of Isla Guaman, in 16 to 24m, fine sand and shells. Large vessels anchor off the entrance of the cove, in 25.6 to 29.3m.

Terminal.—There is a discharge berth for liquefied gas (propane, butane, or mixed) in the cove. Entrance to the cove is 0.2 mile wide; the maximum draft is 10m and the maximum loa is 150m. Supplies of water, bunkers, etc. are obtained from An-tofagasta.

Vessels moor to two buoys off each quarter, and are also held by a line from the shore to the port bow, with both anchors out, lying with ship heading 345˚.

Pilotage.—Pilotage is compulsory. A pilot is essential and should be taken at Antofagasta, where vessels will also be received, unless the master has been to La Chimba before, then the pilot and officials will board off Guaman Island, where there is an anchorage, in 22.3m. There are no navigation lights nearby and entry or sailing is by day only.

Punta Brava (23˚35'S., 70˚23'W.) fronted by foul ground, lies about 2 miles S of Isla Guaman. The coast between is fringed by rocks and unapproachable. A line of high hills backs the coast about 1 mile inland. Punta Brava marks the N limit of Rada de Antofagasta.

Antofagasta (23˚39'S., 70˚25'W.)

World Port Index No. 14660

4.26 Antofagasta lies at the E side of Rada de Antofagasta, which recedes about 0.8 mile E between Punta Brava and a point about 6 miles S. It is an important commercial center. A large part of the import-export trade of Bolivia passes through the port. Bolivia maintains a customhouse here. The harbor is well-protected and large vessels berth alongside for handling cargo. The depth inside the port varies from 9.1 to 27.4m. The port has seven berths varying in depth alongside from 4.8 to 11.2m.

Antofagasta Home Page

http://www.puertoantofagasta.cl

Winds—Weather.—There is no rain except for an occasional short shower. The interior and surrounding hills are completely dry and barren. The prevailing winds are from the SW and are somewhat stronger in summer than in winter. These winds usually rise during the day and die out in the evening. The nights are usually calm. A land breeze, called "puelche" or "terra," occasionally blows during the early morning hours. The land breeze is uncertain, but at times blows with great violence. During the winter the roadstead is visited by heavy squalls that sweep suddenly down through the mountain gorges from the elevated tableland of the interior and frequently interrupt lighter operations.

Fog is extremely rare, but fog and mist may occur sometimes during autumn and winter mornings.

Tides—Currents.—The mean tidal rise at Antofagasta is 0.6m, while the spring rise is 0.9m.

Currents in Rada de Antofagasta are ordinarily of a local nature and dependent on the winds. A coastal current setting S during calm weather has been observed.

A SW swell sets into Rada de Antofagasta throughout most of the year, being more or less pronounced in proportion to the strength of the prevailing winds. During May, June, and July the swell becomes heavier. At such times the sea in the roadstead becomes rough and breaks over the shoals and along the entire shore of the roadstead. This ordinarily lasts from 2 to 4 days.

Depths—Limitations.—The principal harbor, an artificial one situated at the W side of the city, is protected by a breakwater which extends WNW from the shore and thence N. It is entered from the N, the entrance being about 240m wide

between the above breakwater and one which extends W from the shore. The harbor is about 0.2 mile wide in the N part and decreases to about 0.1 mile at its S end. The inner part of the outer breakwater is quayed on its SW and S sides. The E side of the artificial harbor has a long quay for large vessels and a small quay at its S part for small vessels.

The port has seven berths, all of which are used for general and dry bulk cargo, besides a fishing zone and a wharf zone.

Berth No. 1, Berth No. 2, and Berth No. 3 total 620m in length, with depths alongside of 9.1m. Berth No. 4 and Berth No. 5 total 437m in length, with depths of alongside 8.7m. Berth No. 6 and Berth No. 7 total 350m in length, with depths alongside of 9.4 and 11.2m, respectively.

The Wharf Zone has a length of 130m, with a maximum draft of 4.8m. The Fishing Zone has a length of 135m and a maximum draft of 7.3m.

Caleta Poza del Salitre, the old harbor, lies about 0.5 mile ENE of the artificial harbor. Several piers extend from the shores of this cove, which is used only by small craft, yachts, and fishing vessels. The channel to Caleta Poza del Salitre is occasionally impassable because of the heavy swell which rolls over Arrecife Tawn and breaks across the entrance.

Three offshore pipeline berths are situated in Caleta del Cobre, N of Caleta Poza del Salitre. Another offshore pipeline berth extends from the shore a little over 0.5 mile S of the artificial harbor. Mooring buoys and, in some cases, floats mark the seaward ends of the pipelines. Vessels berth on a W heading with both anchors down and lines out to mooring buoys astern. The terminal operators should be contacted for berth particulars and restrictions. It is reported that tankers up to 235m in length, with drafts up to 18.3m, can be accommodated.

Aspect.—Cerro Moreno and Punta Tetas are visible at a considerable distance and cannot be confused by vessels approaching Antofagasta, either from the N or S. Morro Jara is a good landmark for vessels approaching from southward. Cerros del Ancia, a number of hills about 1 mile E of Antofagasta, rise steeply to a height of 293m. A large cement anchor, facing W, is situated near the top of one of these hills.

On closer approach to the port, a hospital, about 1 mile SE of the entrance of the artificial harbor, and a church tower close NW of it, are conspicuous. Large tank farms are situated about 1.5 and 2 miles NNE of the port. Numerous high chimneys and large buildings are situated throughout the city. Several prominent grain silos and warehouses stand on the E side of the harbor. A four-story building, illuminated by fluorescent lights, stands nearly 1 mile ENE of the head of the E breakwater, and two five-story buildings stand about 0.7 mile ESE of the same point. A conspicuous 24-story building stands about 1 mile SW of the hospital. A prominent brewery, with chimneys, stands about 0.8 mile NE of the E breakwater; this building is brilliantly lit at night.

A light is shown from a prominent tower standing on the head of the W breakwater. A radio mast, 75m high, stands on Arrecife Tawn close W of Caleta Poza del Salitre. Red obstruction lights are shown from a radio mast, 60m high, standing about 1 mile ESE from the E breakwater head. A light is exhibited close NE of Arrecifee Tawn at the end of Pier No. 1.

Pilotage.—Pilotage is compulsory. Pilots will board vessels in an area about 0.6 mile NNW of the head of the outer breakwater. The pilot will travel to and from the vessel in a launch specially designed for this purpose. The launch is also used for mooring. Weather permitting, pilots will board by day or night, but ships are not berthed after 2000; they may sail at any time. The pilot may be contacted by VHF channel 9, 14, or 16. Vessels should send their ETA at least 24 hours in advance.

Regulations.—An IMO-adopted Traffic Separation Scheme lies in the approaches to the port and may best be seen on the chart. The inbound traffic lane is situated S of the separation zone.

Signals.—During periods of stormy weather, traffic to and from Caleta Poza del Salitre, as well as in other parts of the harbor, may be restricted. Signals indicating such restrictions are displayed from a mast on the tower of the Harbor Office, about 0.5 mile SE of the entrance of the artificial harbor, and are, as follows:

1. One ball at the dip—The movement of small craft is suspended. Other vessels should look to their moorings.
2. One ball at the masthead—The port is closed and all traffic is suspended.

Anchorage.— Six designated anchor berths, best seen on the chart, lie N and SSW of the outer breakwater. Berth 1 trough Berth 4 are located NNW of the harbor entrance. Berth 5 and Berth 6 are SSW of the W breakwater. The holding ground is not good.

Vessels intending to remain at anchor for several days must anchor under the directions given by the pilot, on a SW heading.

Caution.—Roca Paita, awash, lies about 0.3 mile N of the E side of the entrance to the harbor. A dangerous wreck lies close N of Roca Paita. The rock is the outermost danger of a large shoal area which extends about 0.3 mile N from the harbor entrance, then E to the shore. Arrecife Tawn, consisting of drying and submerged rocks, lies within this area. A shoal, with a least depth of 2.3m, lies about 0.3 mile offshore, 0.8 mile NNE of the E breakwater head. Rocas Abel y Ema lie awash about 0.1 mile offshore, a little over 1 mile NNE of the harbor entrance. A dangerous wreck lies 0.2 mile WNW of Rocas Abel y Ema.

Roca Hornos, with above and below-water rocks and about 0.2 mile long, lies less than 0.3 mile NNE of Rocas Abel y Ema. Roca Celina lies awash about 0.2 mile NE of Roca Hornos. A rock, with a least depth of 8.9m, lies about 0.2 mile SW of Roca Hornos. This rock and others in the vicinity are especially dangerous to vessels mooring off the submerged pipelines in the area.

A prohibited anchorage area, the limits of which are shown on the chart, fronts the harbor entrance.

The head of the W breakwater should be given a wide berth, due to rocks extending up to 30m from it.

Vessels should exercise caution when approaching the anchorage at night, as the lights of the city are reported to be very deceptive.

Antofagasta to Taltal

4.27 Between Antofagasta and Morro Jara, about 12 miles SSW, the coast is backed by a high chain of hills which lies about 1 mile inland.

Caleta Coloso (23˚45'S., 70˚28'W.), with a mooring berth, recedes about 0.3 mile S between Punta Paso Malo, about 7 miles SSW of Antofagasta, and about 0.8 mile WSW of Punta Coloso. A light, with a racon, is exhibited at Punta Coloso. Shoal water extends about 0.1 mile off the S and E shores of the cove. A rocky patch, with 7.3m over it, lies about midway between the two entrance points and about 0.2 mile offshore.

Approach to the berth is made on green leading lights bearing 190˚. Caution must be exercised to avoid the 7.3m patch mentioned above.

Depths—Limitations.—The berth for ore loading consists of dolphins, the berth can accommodate vessels up to 45,000 dwt, 192m in length, and a draft of 11.2m.

The starboard anchor is used for port side-to berthing on two dolphins, while two tugs assist. The least depth at MLW is 13m. Lines are doubled to five mooring buoys and four backsprings are used to the dolphins.The berth usually is sheltered from the strong SW summer winds which. however. occasionally disrupts loading process.

Pilotage.—Pilotage is compulsory and boards 1 mile NW of Antofagasta harbor entrance. Vessels awaiting pilot for Caleta Coloso anchor close to the boarding area in depth of about 40m and are required to be underway before the pilot boards. Pilots may be ordered via the agent on VHF channel 73.

Anchorage.—Vessels anchor, in depths of 20 to 24m, in a sand bed with good holding ground, 0.2 mile ENE of Punta Coloso; avoid the 7.3m shoal patch mentioned above, and the coastal bank, with depths of less than 5.5m, that extends 0.1 mile from SE shore of the cove.

4.28 Roca Negra (23˚47'S., 70˚29'W.), a small dark-colored islet, lies about 2 miles SSW of Punta Coloso and about 0.2 mile offshore. Caleta Bolfin indents the coast about 3 miles S of Roca Negra. The cove has moderate depths and affords anchorage for several large vessels, sheltered from SW winds.

Caution.—The coast between Punta Coloso and Caleta Bolfin, about 2 miles SSW, has been reported to extend about 2.5 miles farther SW than charted.

Morro Jara (23˚52'S., 70˚30'W.) is steep and conspicuous. It lies on a small peninsula that extends about 1 mile W from the coast. Monte Jaron, about 4 miles E of Morro Jara, is conspicuous and a good landmark for ships approaching Antofagasta from the S.

Islote Aguila lies close offshore, about 4 miles S of Morro Jara. A white pyramidal beacon stands on the coast about 3 miles S of Islote Aguila. Punta Amarilla lies about 9 miles S of Morro Jara. The point can be recognized by a large yellow patch which is visible at a considerable distance.

4.29 Caleta Agua Dulce (24˚08'S., 70˚30'W.) provides indifferent shelter with deep water and a bottom of stone, sand, and shell. The hills surrounding the cove rise abruptly from a rocky shore to a height of about 594m. Pica Agua Dulce, 714m high, rises at the N side of the cove. Another mountain, 1,890m high and with a yellow patch on its W side, rises about 4 miles ESE of the innermost shore of the cove.

Caleta Agua Salada, about 3 miles S of Caleta Agua Dulce, may be recognized by the large yellow patch on the 1,890m high mountain mentioned above. Punta Agua Salada, the S entrance point of the cove, is high, steep, and of a darker color than the adjacent coast. A submerged rock lies about 0.3 mile W of the point. Foul ground, marked by kelp, lies up to 0.2 mile off the SE shores of the cove.

Anchorage.—Anchorage can be obtained, with local knowledge, in depths of 22 to 31m, rock and sand, about 0.8 mile NE of Punta Agua Salada.

Punta Moreno, about 3 miles S of Punta Agua Salada, is low and rocky, and is the only low land in the vicinity. Roca Moreno, an above-water rock, lies at the outer edge of a reef which extends about 0.1 mile N from the point.

Caution.—It was reported that the coastline between Punta Moreno and Morro Jara, 25 miles N, lies up to 1.5 miles farther W than charted.

Caleta El Cobre recedes about 0.4 mile SE between Punta Moreno and a point about 0.8 mile NE. A winding road on the hill on the S side of the cove is a good landmark. Two white-topped islets lie close offshore, about 0.5 mile N of the NE entrance point of the cove. Just N of the islets is a long, black point with a dark sandy patch on it.

Anchorage.—Anchorage may be taken in Caleta El Cobre, about 0.2 mile NE of Punta Moreno, in 21.9m. Small vessels can anchor closer inshore, in 12.8m, sand.

4.30 Punta Tres Picos (24˚20'S., 70˚32'W.) lies about 5 miles S of Punta Moreno, and Peninsula Cangrejos lies about 2 miles farther S. The peninsula is about 9.1m high and is connected with the coast by a sandy isthmus, about 0.9m high and about 0.3 mile long. Above and below-water rocks extend about 0.2 mile N from the peninsula. Caleta Blanco Encalada recedes a little over 0.3 mile S between Peninsula Cangrejos and a point nearly 1 mile ENE. The cove is protected from S winds by the peninsula. The S and E shores of the cove are fringed with rocks which extend up to 0.2 mile from the shore. The best anchorage is about 0.4 mile ENE of the N extremity of Peninsula Cangrejos, in 14.6 or 16.5m, fine sand.

Punta Dos Reyes (24˚32'S., 70˚35'W.), though low, is one of the most prominent on this part of the coast. The coast between Peninsula Cangrejos and Punta Dos Reyes is generally rocky with dangers lying nearly 1 mile offshore in places. A short distance inland is a hill with a depression about 280m high.

Punta Buitre lies about 4.5 miles SSE of Punta Dos Reyes. Roca Buitre, with 1.8m over it, lies about 0.5 mile W of Punta Buitre. The sea sometimes breaks violently over this rock.

Caleta Colorada recedes about 0.2 mile SE, between Punta Piedra, about 1.5 miles S of Punta Buitre, and a point about 0.5 mile NE. A rock lies awash about 0.2 mile offshore, in a position about 0.5 mile WSW of Punta Piedra. Rocks lie up to 0.1 mile W of the NE entrance point of the cove. A conspicuous observatory, which is visible for up to 50 miles, is situated 7 miles E of Caleta Colorada.

Anchorage.—Anchorage can be taken about 0.3 mile NE of Punta Piedra, in 18.3m. This berth affords the best protection from the prevailing SW swell.

4.31 Punta Plata (24˚43'S., 70˚35'W.) lies about 5 miles S of Punta Piedra. The N part of the coast between these two points has rocks which lie nearly 1 mile offshore. The point is

low and rocky, but gradually rises in height to 509m. Rocks lie up to about 0.5 mile off the point. Punta Plata resembles Punta Dos Reyes, but is higher.

Punta Rincon lies about 14 miles SSE of Punta Plata, the coast between these two points having rocks which extend nearly 1 mile offshore. Punta Rincon consists of three low points backed by high mountains. Rocas del Rincon, consisting of a small white islet surrounded by above and below-water rocks, lie about 1 mile SW of Punta Rincon.

The coast recedes about 3 miles E between Punta Rincon and Punta Grande, about 10 miles S. The shores of this bight are generally rocky, foul, and subject to a frequent heavy swell that breaks on them. Punta Guanillo, low and white, lies about midway between these two points and at the innermost part of the bight. A rock lies about 0.1 mile W of the point.

Caution.—A magnetic disturbance has been reported near the coast in this vicinity.

Rada del Paposo lies between Punta Guanillo and a point about 1.5 miles N. There are general depths of 12.8 to 40m in the outer part of the roadstead. The E shore of the roadstead is fringed by shallow water and rocks to about 0.2 mile offshore. Roca Guanillo, a very conspicuous rock of reddish-ash color, consisting of two pinnacles, lies about 0.8 mile N of Punta Guanillo and about 0.2 mile offshore.

A small village, practically abandoned, is situated E of Punta Guanillo. There is a small pier and telephone service to Taltal.

Punta Grande (25˚06'S., 70˚30'W.) appears high and rounded when viewed from the SW. It terminates in a low steep bluff, on which are several hummocks. The point is surrounded by rocks and breakers to about 0.8 mile offshore.

Bahia Nuestra Senora recedes about 4 miles E between Punta Grande and Punta Taltal, about 16 miles S. Rocks and reefs, which extend about 0.5 mile offshore, are scattered along the shores of the bay. Punta Taltal, the S entrance point, is low and has two conspicuous knobs on it. Islote de Afuera, with a rock close N of it, lies on a reef which extends about 0.2 mile N from the point.

Caution.—Caution should be exercised when rounding Punta Taltal, as the current sets toward Islote de Afuera and tide rips are experienced for about 1.3 miles N of the point. Breakers have been observed as much as 0.8 mile from the point during a strong wind. An unconfirmed depth of about 12.8m was reported about 5 miles NNW of Punta Taltal.

Caleta Oliva is a small exposed cove about 10 miles SSE of Punta Grande. Anchorage can be taken, in 40 to 48m, with a large wooden anchor on a hill near the beach bearing 099˚. Closer in, the bottom is rocky, and many anchors have been lost here.

Cerro Perales, 1,084m high, rises about 5 miles E of Punta Taltal. The hill is conspicuous because of its brighter color than other hills in the vicinity.

Taltal (25˚24'S., 70˚29'W.)

World Port Index No. 14650

4.32 Taltal occupies a bight which recedes about 1 mile S between Punta Taltal and Punta Hueso Parado, about 2 miles E. The harbor of Taltal consists of Puerto Taltal and Caleta Ossa, a cove on the E side of Puerto Taltal. The port was important for the export of nitrates and metals, but is now reported to be largely a fishing port.

Winds—Weather.—The harbor is protected from the prevailing SW winds by Punta Taltal. It is open to winds between W and N, but these seldom blow with sufficient force to interfere with vessels at anchor. However, Chilean authorities have reported that winds have occasionally reached velocities able to cause damage to vessels at anchor. Occasional heavy swells set into the harbor from October through December and may interrupt work at the anchorage.

Fogs are rare, but may occur during the months from August to December.

Tides—Currents.—The mean tidal rise here is 0.6m, while the spring rise is 0.9m.

Within Puerto Taltal, there are currents which vary in rate and direction, making the mooring of ships difficult at times.

Depths—Limitations.—An anchorage berth for the working of nitrates is situated about 0.3 mile offshore, in a depth of 18m.

A tanker anchorage berth, with two mooring buoys, is situated in Caleta Ossa in depths of 14.7m.

A government wharf, 22m long at its head, can accommodate a vessel with a maximum draft of 6m at high water.

Aspect.—A conspicuous white hill, 285m high, lies about 1 mile S of Punta Taltal.

The two N of a group of three conspicuous hills lie between 0.8 and 1 mile S of Punta Hueso Parado. The N hill is 56m high, conical, and surmounted by a red water tank. The second hill, about 0.1 mile SW of the above hill, is 31m high, while the third and S has a religious statue on its summit.

A 134m hill, nearly 1.5 miles S of Punta Hueso Parado, has some slag heaps on its W side which are black and visible at a considerable distance. There are white patches on points, about 1 mile and 1.3 miles SE of Punta Taltal. A conspicuous billboard is situated on a hill about 1.8 miles SE of Punta Taltal.

A conspicuous white church spire is situated in the town a little over 1 mile SSW of Punta Hueso Parado. A red brick chimney stands about 0.5 mile SSE of the same point.

Pilotage.—Pilotage is compulsory for all vessels. The port has no official pilot station. Vessels calling at the port should send their ETA at least 24 hours in advance through Valparaiso radio. The pilot is supplied from Antofagasta. The harbormaster's office may be contacted on 2182 kHz or VHF channel 16. Entry into the port at night is unsafe.

Anchorage.—The best anchorage is reported about 0.3 mile N of the government wharf, in depths of 20 to 26m, sand.

Caution.—Numerous lighters, not lighted and hard to identify by radar, are moored along the shores of the port.

Taltal to Chanaral

4.33 Bahia Isla Blanca recedes about 3 miles SE between Punta Taltal and Punta San Pedro, about 9 miles SW. The shores of the bay are rocky and there are no anchorages. A number of white islets lie off a steep, prominent point on the SE side of the bay. Reefs extend about 0.5 mile from the SE side of the bay.

Punta San Pedro (25˚30'S., 70˚38'W.) is steep and has a conspicuous high, round hummock a short distance inland. Reefs extend about 0.5 mile from the N side of the point. The W side of the point has rocks which extend about 0.3 mile offshore.

Punta Tortolas, about 3 miles SSW of Punta San Pedro, has the appearance of an island, but is joined to the shore by a low shingle spit. The summit of Punta Tortolas is steep and has several sharp peaks on it. Close N of the point is a narrow cove where vessels load copper ore. The anchorage in the cove offers a depth of 11m.

Bahia Lavata (25˚39'S., 70˚40'W.) recedes about 1.5 miles SE between Punta Artigas and Punta Lavata, about 3.3 miles SW. Punta Molina, about 2 miles S of Punta Artigas, divides the bay into two coves. Caleta Cifuncho, the N of these coves, is further divided by Punta Garcia into two inlets, the N of which is of no consequence. The S inlet recedes about 0.6 mile SE between Punta Garcia and Punta Molina. A rock lies on the SW side of Caleta Cifuncho, about 0.2 mile E of Punta Molina.

Anchorage.—Anchorage can be taken about 0.5 mile ENE of Punta Molina, in 21.9m, sand.

Caleta de Afuera, the southernmost of the coves in Bahia Lavata, recedes about 0.3 mile SE between Punta Molina and Punta Lavata. Roca Silva, with less than 1.8m over it, lies about midway between these points and about 0.1 mile offshore. A shoal extends about 0.1 mile from the E side of Punta Lavata.

Anchorage.—Anchorage may be taken about 0.2 mile NE of the NE end of Punta Lavata, in 20.1 to 23.8m.

4.34 Punta Lavata is cliffy and has rocks projecting from its base. The highest part of the point has several steep summits which are furrowed by ravines.

Bahia Ballenita recedes about 0.8 mile SE between a point about 5 miles S of Punta Lavata and Punta Ballenita, about 2 miles SW. The shores of the bay are generally rocky and unprotected. The hills surrounding the bay present a rugged, barren appearance.

Punta Ballenita (25˚47'S., 70˚44'W.), the SW entrance point of Bahia Ballenita, is nearly 46m high. Islote Tope Blanco, which has a white summit, lies about 1 mile W of the point. The channel between the island and the point has been reported to possess irregular depths, and is not recommended for navigation. A vessel reported striking a rock in a position about 0.5 mile N of Islote Tope Blanco. The position of the rock is doubtful.

Caution.—In addition to the general current, a coastal current has been observed between Punta Ballenita and Punta Morro. This current sets NE at a velocity of 1.5 knots. Because of this current, vessels should exercise caution and keep well seaward of Punta Ballenita.

Punta Ballena lies about 4.5 miles S of Punta Ballenita. Numerous small rocky islets lie close off the point.

Caleta Esmeralda (25˚55'S., 70˚42'W.) can be recognized by high hills behind it, one of which is 627m high. Islotes Fernandez Vial, between about 0.3 and 0.6 mile offshore, are also useful in recognizing the cove. The cove is visited by small coastal vessels.

Islotes Fernandez Vial have rocks and reefs which extend about 0.1 mile from their N sides, and rocks lie about the same distance NW of the N extremity of the W islet. Rocas Aldea consist of three rocks which lie about 0.1 mile offshore, nearly 1 mile N of the W islet. Small above-water rocks lie about 0.2 mile WSW and NW of the S entrance point of the cove. A shoal, with 7.8 to 9.1m, lies about 0.1 mile NE of the latter rock. The cove is lined with reefs and kelp which extend up to 0.1 mile offshore in places.

Depths of 27.4 to 29.3m in the center of the entrance of Caleta Esmeralda decrease gradually toward the shore. The passage between Islotes Fernandez Vial and the mainland, though deep, is narrowed by reefs and of use only to small vessels in good weather. A pier is situated in the cove. Several buildings are situated close E of the pier.

Anchorage.—The best anchorage is about 0.3 mile N of the E end of the E islet, in 16.5m, sand and mud.

Punta Carrizalillo lies about 9 miles SSE of Caleta Esmeralda. The coast between these points is generally low and rugged, but is backed a short distance inland by a chain of high hills. Rocks lie up to 0.5 mile offshore between the points.

4.35 Isla Pan de Azucar (26˚09'S., 70˚41'W.), about 6 miles S of Punta Carrizalillo, lies with its E extremity about 0.5 mile offshore. The island appears light brown and whitish in color. There are two peaks on the island, with the highest near the center. Above-water rocks extend nearly 0.5 mile NW from the island. The outermost and highest rock is 4.9m high, and lies nearly 2 miles offshore. An islet lies about 0.3 mile S of Isla Pan de Azucar.

When coming from the S, one should not confuse the two peaks on Isla Pan de Azucar with two similarly-shaped hills on the mainland. These lie a short distance inland and S of the island. The hills are higher and more rounded than those on the island.

Caution.—A current, which ordinarily sets N at a velocity of 0.3 knot, has been observed in the vicinity of Isla Pan de Azucar. Strong winds increase the velocity of the current considerably. The current tends to set vessels toward the coast. With continued NW winds, the current is stopped and sometimes flows S.

Puerto Pan de Azucar is situated between Isla Pan de Azucar and the mainland to the E. Punta Rodriguez, about 1.3 miles ENE of the N extremity of Isla Pan de Azucar, is a jagged peak 76m high. The point divides Puerto Pan de Azucar into two coves, Caleta Norte which lies N and E of the point, and Caleta Sur which lies S of the point, between Isla Pan de Azucar and the mainland. About 1.5 miles SE of Punta Rodriguez, there is a white patch which is conspicuous from the N. The patch forms a good landmark as it is more easily identified than Isla Pan de Azucar.

The channel leading to Caleta Sur from the S, between Isla Pan de Azucar and the mainland, has depths of 11.9 to 13.7m, but is narrowed by shoals on either side to a width of about 0.1 mile.

Anchorage.—Vessels can take anchorage in Caleta Norte, about 0.5 mile NE of Punta Rodriguez and about 0.3 mile offshore, in 25.6m, sand. A strong offshore breeze blows in this cove for about 3 hours after sunrise, and vessels must use

sufficient chain to prevent dragging to seaward. Anchorage may be taken in Caleta Sur, a little over 0.3 mile N of the E extremity of Isla Pan de Azucar, in 21.9 to 37m, sand. The depths increase rapidly N of this position. This anchorage is more protected than that in Caleta Norte.

Cabo Falso Pan de Azucar lies about 3 miles S of Punta Rodriguez. The point is hilly and moderately high. An islet lies close off its NW extremity. Caleta Playa Blanca, northward of the point, provides some shelter from N winds, but is open to S winds.

Punta Achurra (26˚18'S., 70˚41'W.), about 6 miles S of Cabo Falso de Azucar, is low and rounded. A short distance inland there is a sandy plain on which are some conspicuous hills, the highest of which is 184m high. Farther E is a range of hills from 186 to 433m high, the summits of some being covered with bushes. The W and S sides of Punta Achurra are fringed with above and below-water rocks, and vessels should remain at least 0.5 mile off the point. A main light is shown from Punta Achurra.

Chanaral (26˚21'S., 70˚39'W.)

World Port Index No. 14640

4.36 Chanaral occupies the SE end of a bay, which recedes nearly 2 miles E between Punta Achurra and Punta Bryson, about 3.5 miles SSE. Caleta Barquito lies on the S side of the bay and is an important adjunct to the port of Chanaral. The town of Chanaral is situated on the SE shore of the bay. The port of Chanaral, along with Caleta Barquito, is important for the shipment of copper and ores.

Winds—Weather.—The prevailing winds blow from the S and SW and are quite strong, particularly during January and February. Storms from the W and NW may occur during May and June, and may interrupt all work in the harbor for short periods. Easterly winds, which generally blow at night, create a moderately-heavy sea in the bay.

Fogs are most frequent during the months from April to August, but may occur in other months also.

Tides—Currents.—When easterly winds off the land are blowing, a current is created which sets W along the S shore of the bay.

Depths—Limitations.—The depths in the bay are moderate. There are depths of 33 to 37m in the entrance of the bay, which decrease gradually toward the shore. The 10m curve lies about 0.2 mile off the E shore of the bay and up to 0.1 mile off the S and SE shores. Vessels with a draft exceeding 7.6m are advised not to enter within the 20m curve in the bay without a pilot, as depths of 8.2m have been found in places.

Rocas Simpson extend about 0.3 mile WNW from Punta Bryson, the S entrance point of the bay. The outermost rock has a depth of 6m over it. Rocks with less depths, one of which is awash, lie between the outermost danger and the shore. Rocks, with depths of 5.2 and 5.5m, lie 0.1 mile ENE and E, respectively, of Punta Bryson, both about 0.1 mile offshore. Vessels approaching the bay should give Punta Bryson a wide berth.

Rocks, with a least depth of 3.9m, lie off Punta Piedra Blanca in a position about 0.5 mile NE of the head of the pier in Caleta Barquito.

The washings from a copper mine, discharged into the side of the bay, are mostly deposited in the SE corner and has caused considerable seaward extension of the coastline, with shoaling within about 0.8 mile of the shore.

Large vessels anchor or moor, and cargo is worked by barges. A Naval pier extends from the shore about midway between Punta Piedra Negra and Punta Piedra Blanca. A second pier, reported to be in a poor state of repair, lies about 150m further WSW. A pier in Caleta Barquito extends from the shore nearly 0.2 mile ESE of Punta Bryson, and is used by small craft. A submarine pipeline extends about 0.2 mile N from the head of the pier in Caleta Barquito.

Muelle Punta Piedra Blanco, a T-headed pier, extends 38m NNW from the headland; the width of the head is 6m. Copper ore and concentrates are loaded at a rate of 1,000 tons per hour through a fixed chute, necessitating warping to position successive hatches beneath the chute. The pier is also used for discharging general cargo. Vessels up to 200m long may berth at this pier.

Vessels can be berthed alongside the face of the pier using seven mooring buoys, a shore line, and the starboard anchor. Care must be taken that the ship's bow does not swing on to the 4m rocky shoal which lies 91m SW of the head of the pier. Vessels are loaded one hatch at a time from a conveyor that extends from the shore.

Generally, vessels up to 240m in length, 30m beam, and 12.5m draft can be accommodated. It was reported that vessels up to 69,900 dwt, 260m in length, and 36m beam had been handled.

It was reported that at the oil terminal in Caleta Barquito vessels are limited to 250m in length, 20m maximum draft, and moored to three buoys.

Aspect.—The bay is large and exposed. A sandy beach, 2.8 miles long and on which the surf beats continuously, forms the head of the bay. On the S side of the bay, hills rise abruptly from the sea forming an excellent shelter from S winds. On the N side of the bay the hills, which are also steep, lie farther from the shore. The appearance of the land is barren. A broad valley runs inland with steep hills on either side, their lower slopes and hollows being covered with sand.

Isla Pan de Azucar is the most conspicuous landmark for vessels approaching from northward. The white patch on Punta Rodriguez is also a useful mark.

Several oil tanks stand on Punta Bryson. A conical mountain a little over 0.5 mile S of Punta Bryson rises to a height of 369m and is conspicuous from the N.

A power station, with several tall chimneys, is situated in Caleta Barquito and is a good mark for recognizing the bay.

Punta Piedra Blanca, about 0.8 mile ENE of Punta Bryson, is whitish and has yellow rocks and hills above it. The ore loading pier at Punta Piedra Blanca is conspicuous. Punta Piedra Negra, nearly 0.5 mile ENE of Punta Piedra Blanca, is composed of black rocks which rise to a height of 33m. The contrast between these two points is remarkable. A prominent circular concrete tank surmounts Punta Piedra Negra.

Mogote Rayado, about 0.2 mile S of Punta Piedra Negra, is a dark rock about 52m high which shows up well against the sandy slopes behind it. A prominent white stripe runs down the face of the hummock.

The gateway of the cemetery, about 0.5 mile NNE of the town, consists of two buildings surmounted by crosses and is prominent. A radio tower is situated about 1.5 miles NE of Punta Piedra Blanca and another, which is occasionally lit, stands 0.8 mile SE of Punta Piedra Blanca.

Lights are shown from the ends of the ore loading pier and the small craft pier. Two sets of range lights mark the anchorage off Caleta Barquito. The first pair stand about 0.2 mile S of Punta Piedra Blanca and are in line bearing 110˚. The second pair is situated about 0.2 mile SSW of Punta Bryson, and are in line bearing 200˚.

Pilotage.—Pilotage is compulsory and a pilot is available. Berthing is only possible between 0700 and 1800, but the pilot can be obtained at other times upon the authorization of the port captain. The pilot boards about 1.1 miles NW of the light at the head of Muelle Mecanizado Santa Fe. Vessels should send their ETA 24 hours and 12 hours in advance and confirm 3 hours in advance. The port can be contacted by VHF channel 9, 14, or 16.

Anchorage.—Ships can anchor, in depths of 14 to 15m, with the head of the pier that extends from the shore about midway between Punta Piedra Negra and Punta Piedra Blanca bearing 145˚, distance about 0.5 mile. The holding ground is good, but the anchorage is open to winds between the WSW and NW. For vessels carrying explosives, the anchorage is 0.8 mile WNW of Punta Piedra Negra, or as directed by the Port Captain.

The recommended anchorage in Caleta Barquito for deep draft vessels is 1 mile NNW of Punta Bryson, in a depth of 31m; smaller vessels anchor between 0.5 and 0.7 mile N of Punta Piedra Blanca.

Caution.—When approaching the mooring buoys, caution is advised due to shoal water lying near them.

Vessels should moor on a WSW heading in order to keep head on to the swell.

Chanaral to Caldera

4.37 Punta Las Animas (26˚23'S., 70˚42'W.) is low and rocky. A reef extends about 0.5 mile NW from the point. Cerro Tronador, about 3 miles SE of Punta Las Animas, is 632m high. Bahia Las Animas lies N of Punta Las Animas. Anchorage may be taken near the center of the bay about 0.5 mile offshore, in 12.8m, but the holding ground is poor and the anchorage is exposed to the prevailing wind and sea. The N entrance point of Bahia Las Animas consists of a rock and a round hill, which rises directly from the water's edge. The sides and top of the hill are lined with conspicuous black stripes.

Punta Infieles, about 2 miles S of Punta Las Animas, is backed by hills which rise to over 400m. Punta Salado lies about 5 miles S of Punta Infieles. Rocky islets lie close off all sides of the point. Punta Flamenco lies about 1.5 miles S of Punta Salado and is backed by hills which rise from the shore to a height of 225m. Two islets lie close off the point.

Puerto Flamenco recedes a little over 1 mile E between Punta Roca Baja, about 1.5 miles S of Punta Flamenco and Punta Patch, about 2 miles farther S. Punta Roca Baja is low and rocky with a detached hill rising from the low ground close inland. This point is surrounded on its W, S, and SE sides by an extensive reef, with numerous rocks which lie nearly 0.2 mile offshore. Punta Patch is dark and rugged. It is backed E and SE by five or six low hills, which rise directly from the shore. Two small groups of rocky islets lie close off the W and N sides of the point. At the head of Puerto Flamenco the land is low and a deep valley trends E between two ranges of rugged hills. The hills are covered with sand from their bases to about half-way up their sides. There is a settlement of about 60 houses on the SE side of the bay.

Except in its S part, Puerto Flamenco is not well-sounded. There are depths of 27.4m about 0.4 mile from the shore, decreasing toward the S. Depths of 5.5 to 9.1m are found close off the S shore. Rocks lie up to 0.1 mile offshore along the SE side of Puerto Flamenco. Anchorage may be taken about 0.5 mile E of Punta Patch, in depths of 12 to 14m, sand. The anchorage is protected from S winds by Punta Patch and from N winds by Punta Roca Baja. Puerto Flamenco is primarily a fishing harbor, but is visited by coastal vessels and occasionally by larger vessels which call here to load ore.

4.38 Punta Flamenquito (26˚36'S., 70˚42'W.) is low, rocky, and is surrounded by several islets which lie within 0.5 mile offshore. Several low hills back the point. Punta Salinas, about 2 miles SSW of Punta Flamenquito, has a rounded appearance, but is rather rocky. Cerro Obispo rises about 2 miles SE of Punta Salinas. The W side of the mountain extends nearly to the point.

Punta Obispo lies about 3 miles SSW of Punta Salinas. A rock, with less than 10m, lies close N of the point. Caleta Obispo, NE of Punta Obispo, is exposed and not recommended, even for small vessels. Islote Blanco, close off a point about 1 mile SW of Punta Obispo, is a good landmark. Caleta Obispito recedes about 0.8 mile E between Punta Obispito, about 2 miles S of Punta Obispo, and a point about 2 miles SW. The rocks forming the S entrance point of the cove are remarkable for their blackness. Roca Blanca lies close offshore, about 0.5 mile SW of the S entrance point of the cove. The shore of the cove is generally low and rocky, and is fringed with reefs which extend about 0.3 mile offshore.

There is apparently no danger in entering Caleta Obispito, but the cove is quite open to the SW and a heavy sea sets in with the ordinary coastal wind. The best anchorage appears to be in the NE part of the cove, in 16.5m, sand, with a prominent house bearing between 102˚ and 113˚.

A reef lies about 1 mile W of Punta Zenteno (26˚49'S., 70˚48'W.). The reef extends about 1 mile N and S, and consists of numerous submerged rocks over which the sea breaks violently whenever there is a heavy swell. Caleta Zenteno, S of Punta Zenteno, affords good anchorage, in 25.6m, sand. The anchorage is well-protected from the prevailing SW winds.

Punta Totoralillo, about 2 miles SW of Punta Zenteno, consists of a narrow peninsula which extends about 0.8 mile W from the general trend of the coast. Three small islets lie within 0.5 mile N of the point. A submerged rock lies just N of the largest of these islets. Bahia de Totoralillo recedes about 1 mile E between Punta Totoralillo and Punta Cabeza de Vaca, about 1.5 miles SSW. A sandy beach lies at the head of the bay.

4.39 Punta Cabeza de Vaca (26˚53'S., 70˚50'W.), one of the most salient points along this part of the coast, has two small hummocks near its extremity. East of the hummocks, the

land is low for some distance, then it rises to several low hills which form the W extremity of a chain of coastal hills.

Caution.—Two vessels, one of which has a draft of 3m, have reported striking a rock about 3 miles W of Punta Cabeza de Vaca. The rock is charted on the latest Chilean chart about 3 miles WSW of the point, however, the position is doubtful. Several surveys of the area have failed to find this danger.

Punta Frodden, about 4.5 miles SSE of Punta Cabeza de Vaca, is steep and rocky, and is fronted by several islets. The point is backed by hills of moderate height. Bajo Nef, with 6.4m over it, lies about 1.5 miles SW of Punta Frodden and about 1 mile offshore.

Caleta Mora (27˚00'S., 70˚49'W.), NE of Islotes Ramadas, provides anchorage, in 13.7m, about 0.3 mile offshore. It is sheltered from SW winds. Roca Pulpo, with 7.9m of water over it, lies about 1.3 miles WSW of Islote Ramadas. The sea breaks over Roca Pulpo in bad weather.

Punta Francisco (27˚02'S., 70˚50'W.) is the N entrance point of Puerto Caldera. Islets and rocks extend up to 0.2 mile NW and 0.2 mile SW from the point. Roca Chango, with 7m over it, lies about 0.5 mile W of Punta Francisco and is a danger in the immediate approach to Puerto Caldera. In heavy weather the sea breaks on this rock. There is a 14.5m stony patch, 0.3 mile WSW of Roca Chango.

Punta Caldera (27˚03'S., 70˚52'W.) is the S entrance point of Puerto Caldera. The point is low and located at the W end of a small peninsula. Islote Centinela Blanco and Islote Centinela Negro are islets which stand on a reef extending up to 0.3 mile W of the point. A main light is shown from Punta Caldera.

Caldera (Puerto Caldera) (27˚03'S., 70˚50'W.)

World Port Index No. 14630

4.40 Caldera lies at the S end of a bight, which recedes a little over 1.5 miles SE between Punta Francisco and Punta Caldera, about 1.8 miles SSW. The town of Caldera is situated on the S shore of Puerto Caldera. The port is important for the shipment of ore and copper.

Winds—Weather.—The bay is protected from the prevailing SW winds. Strong N winds sometimes send a heavy swell into Puerto Caldera, particularly in the S part of the harbor. The port is situated at the N limit of these winds; they are seldom of sufficient force to interrupt work here.

The climate is very mild and there is no rain. Fogs are infrequent, and usually disappear by noon.

Tides—Currents.—The mean tidal rise here is 0.6m, while the spring rise is 0.9m. Strong currents setting S into Puerto Caldera occur when there are strong N winds. A strong current was reported setting NE across the entrance of the bay.

Depths—Limitations.—The ore pier, which extends 0.1 mile from the SW side of the bay, is 10m wide at its head. Two concrete dolphins are situated on either side of the pier head, to which ships make fast. Ships up to 270m in length, with a maximum draft of 12.5m, berth port side-to using the starboard anchor.

Punta Caleta is located 1.2 miles SE of Punta Caldera, is steep-to, and is surmounted by some conspicuous monuments.

Muelle Punta Caleta lies 300m NW of Punta Caleta. It has a berthing face 100m long and is 17m wide; its constructed of concrete on steel piers. There are two roadways 4.6m wide and 70m long, giving access to the berth from the shore. The berth has good fendering and five mooring buoys in the vicinity. Vessels with a maximum draft of 11m may use the berth. Leading lights, in line bearing 225˚, lead to the berth.

Muelle Fiscal, used for general cargo discharge, lighters, and small craft berthing is situated 1.5 miles SW of the light on Punta Caldera. The pier extends 223m NW from a rocky point. The pier has a usable length of 108m and will accept a vessel with a maximum draft of 6.7m. A short small craft pier projects from the coast close W of it.

A multi-point oil mooring, with a depth of 10m, is situated in a cove about 1.3 miles NE of the ore pier, to which vessels secure in daylight only. Tankers, with a maximum length of 200m and a maximum draft of 12m, can be accommodated. It is capable of handling vessels of 35,000 grt.

A wharf, with a berthing face of 90m and four dolphins, is situated at Punta Padrones, about 0.6 mile E of Punta Caldera. Ships with a maximum draft of 10.4m can be accommodated.

Aspect.—Most of the shore of the bay is covered with loose sand, with the exception of a few rocky points. The head of the bay is low, but the hills rise a short distance inland. The ranges become higher as they recede from the coast. Cerro Agudo is a prominent sharp-topped hill, which lies about 3.8 miles E of Punta Francisco. The sides of the hill are covered with sand and there are two lower peaks near it. A conspicuous white tank is situated close to the root of the ore pier. A prominent white house stands about 795m WSW of the pier head; a church stands about 0.8 mile SE of the pier head.

A radio mast, with high intensity obstruction lights, stands about 1 mile SE of the ore pier head. An aeronautical radiobeacon is situated at the mast.

A set of range beacons leads to the oil berth at the NE side of the bay. A light is shown close S of the beacons and several tanks stand close NNE of them.

Pilotage.—Pilotage is compulsory. Pilots board in the waiting area, best seen on the chart. Vessels should send their ETA 24 hours and 12 hours in advance. Tankers should include the amount of cargo to be discharged in the message. The port can be contacted on VHF channel 16.

Anchorage.—Vessels can anchor in any convenient depth in Puerto Caldera. Large vessels may find anchorage with the head of the ore pier bearing 220˚, 0.6 mile distant, in a depth of 20.1m, sand. Vessels in quarantine and those carrying explosives anchor in the NE side of the bay.

The local authorities suggest that vessels intending to remain anchored for some time stream a kedge anchor, or secure the vessel's stern to a mooring buoy on a N heading, to bring the vessel bows on to a N or NW wind and accompanying swell.

Caution.—A local magnetic anomaly is reported to exist in the bay.

4.41 Puerto Calderilla (27˚05'S., 70˚52'W.) (World Port Index No. 14635), a subsidiary port of Caldera, is situated in Caleta Calderilla, about 2 miles S of Punta Caldera Light. The bay recedes about 1 mile SE between Punta Zorro and Punta Caldereta, about 0.4 mile SW. Rocks which extend up to 0.1 mile from each of these points narrow the entrance of the cove

to about 0.3 mile. A beacon is situated on Punta Zorro and a light is shown from Punta Caldereta. Islotes Jorge are a group of small rocky islets located about 0.5 mile SW of Punta Caldereta.

The E and S shores of the cove are bordered by shallow water and dangers, which lie up to 0.3 mile offshore. Peninsula Ester, formerly Islote Ester, is connected to shore by a causeway and lies about 0.2 mile offshore in the S part of the cove.

An ore terminal is situated on the NE side of Peninsula Ester, where a vessel with a maximum length of 230m and a draft of 14m can be accommodated. Ships make fast to seven mooring buoys.

A pontoon pier, used for the production of fish meal, lies 0.5 mile NE of Peninsula Ester.

Two white, triangular beacons, situated at the SE end of the bay, lead through the entrance into the bay. A conspicuous tank stands on the W side of Peninsula Ester.

Pilotage.—Pilotage is compulsory. Vessels bound for the port must first call at Caldera to obtain clearance and a pilot.

Anchorage.—Anchorage may be taken, in 13.7 to 18.3m, sand, about 0.2 mile NE of the ore terminal. Small vessels can proceed further SE, but should not pass S of a line joining Peninsula Ester and Punta Este.

Puerto Calderilla to Huasco

4.42 Bahia Inglesa (27˚07'S., 70˚54'W.), 2 miles SW of Caleta Calderilla, is deep throughout. Because it is exposed to N winds and the holding ground is poor, Bahia Inglesa is of no use to navigation. Extensive shellfish cultivation areas lie within the bay.

Punta Morro (27˚06'S., 70˚57'W.), the S entrance point of Bahia Inglesa, is rocky, steep, and has conspicuous white patches on its S side. It is the N end of a chain of mountains which extends SE from the point. Punta Morro is reported to give a good radar return. Morro Copiapo lies about 1 mile S of Punta Morro. It is nearly level at the top and has two small hummocks near its E extremity. The E side is very steep. Morro Copiapo can be seen 30 to 35 miles in clear weather.

Punta Medio (27˚10'S., 71˚00'W.), about 4.3 miles SSW of Punta Morro, is a small tongue of land, the SW side of which is furrowed by two prominent ravines. Several rocks and islets lie close off the point. Punta Huber lies about 2.3 miles SSE of Punta Medio, and is steep and rocky.

Caleta Turenne recedes about 0.5 mile E between Punta Totoral, about 2 miles SSE of Punta Huber, and Punta Vial, about 3 miles S of Punta Huber. The cove is easily entered and affords good anchorage inside the line joining the entrance points, in 14.6m, sand. This anchorage is protected from the prevailing winds.

Isla Grande lies with its W side nearly 1 mile W of Punta Vial. The island is very conspicuous, having a small nipple at each extremity; the one at the NE end being the larger. An islet lies at the extremity of a reef which extends about 0.2 mile NE from the NE end of Isla Grande. The channel between Isla Grande and Punta Vial is about 0.5 mile wide, deep, and clear of dangers. A heavy swell sets through the channel, and it is not recommended for any vessel.

4.43 Bahia Copiapo (27˚19'S., 70˚59'W.), formerly an ore shipping port, is no longer used as such because of the poor anchorage and landing facilities. The shore of the bay has an extensive sandy beach near its central part with rocky sections at is N and S ends.

Roca Janequeo, with less than 1.8m over it, lies about 4 miles NNW of Punta Dallas, the S entrance point of Bahia Copiapo, and is the N of a group of reefs which front the bay. Bajo Cumming, with rocks awash, lies about 1 mile WNW of Punta Dallas and is the S of these reefs. Roca Anacachi, about midway between the two above rocks, has less than 1.8m of water over it and, lying about 3.3 miles offshore, is the outermost of these dangers. Between Roca Janequeo and Bajo Cumming are a number of detached reefs with general depths of 0.9 to 1.8m. An above-water rock lies about 2.5 miles NW of Punta Dallas. The sea breaks violently over these reefs whenever a heavy swell sets in.

Anchorage.—Anchorage in the bay is unprotected and generally bad. A long scope of chain should always be used, and as rollers often set in with little warning, it is prudent to drop another anchor. The holding ground is poor, consisting mainly of hard yellow sand with occasional patches of yellow sandstone.

The anchorage for small vessels is inshore, close N of Punta Copiapo, in a depth of about 9m, sand.

Landing on any part of the shore of the bay is difficult and dangerous.

Punta Dallas (27˚23'S., 70˚59'W.) is composed of black rock with a hummock on its W extremity. When seen from S, it appears as an island. Eastward of the point the land rises to a range of low sandy hills with rocky summits.

4.44 Caleta Barranquillas (27˚31'S., 70˚54'W.) recedes a little over 0.3 mile S between Punta Dominguez and Punta Barranquillas, about 0.4 mile WSW. Punta Barranquillas is steep and rocky. Cerro Doble Pico, about 1.3 miles ESE of the point, shows a double point when viewed from S. Shallow water and rocks extend from 91 to 274m from the shore.

Anchorage.—Anchorage may be taken about midway between the entrance points, in 12m. Small vessels can anchor about 0.3 mile E of Punta Barranquillas, in 8m. The bottom is rocky in both anchorages, and neither anchorage is very secure. Strong winds send a heavy sea into the cove.

Punta Salado, about 4 miles S of Punta Barranquilla, is rocky and steep. A group of islets, the largest named Isla Ruky, extends up to 0.8 mile SW from the point. Sandy hills extend SE, then SW from Punta Salado, and back the shore of Bahia Salado.

The coast, for 3 miles S of Isla Ruky, is foul, and there are depths of 8.9m and 11m, about 2.5 and 3 miles SW of the islet.

Bahia Salado recedes about 3 miles SE between Punta Salado and Punta Cachos, about 7.5 miles SW. The shores of the cove are generally fringed with rocks, most of which are above water. There are several coves and inlets in the bay.

Caleta del Medio (27˚41'S., 70˚57'W.) recedes nearly 0.5 mile S, between Punta Bell and Punta Weevil, a little over 1 mile farther E. A shoal, with a depth of 10.4m, lies 0.6 mile NNW of Punta Weevil. Close within the head of the cove there are sandy slopes with some outcrops of rocks. Small vessels

can anchor about 0.5 mile ENE of Punta Bell, in 18.3 to 21.9m. Caleta del Medio is protected from SW winds. The cove is exposed to N winds and vessels are advised not to anchor here during such times. There is a small iron pier on the N side of Punta Slade, on the W side of Caleta del Medio.

Caleta Chascos, E of Punta Cachos, is shallow and foul. There is a depth of only 5.5m about 1 mile from the head of the cove, and the shores are fronted by above and below-water rocks. Two above-water rocks lie off the E entrance point of Caleta Chascos.

4.45 Punta Cachos (27˚40'S., 71˚02'W.), the SW entrance point of Bahia Salado, has an islet and some rocks off its W side. Isla Cima Cuadrada lies close offshore, about 1.5 miles S of Punta Cachos. A square-topped hill stands near the center of the islet. Vessels should give this islet a berth of at least 0.5 mile.

Caleta Pajonal, about 4 miles S of Punta Cachos, is a little over 0.5 mile wide at the entrance and recedes nearly 0.8 mile SE. Isla Cima Cuadrada, described above, is a useful landmark for recognizing the cove from the N. Punta Pena Blanca, described below, is a good landmark for recognizing the cove from the S. A range of hills, backed by others of greater height, rises directly from the N side of the cove. In a valley, about 1 mile from the cove, there is a range of small very steep hills which rise from the low ground.

Shoal water extends from the head of the cove for a distance of about 0.2 mile. Two small above-water rocks, with breakers close NW of them, lie about 0.1 mile W of the S entrance point of the cove. Dangerous submerged rocks lie about 0.8 mile SW of the same point. The sea breaks over these rocks whenever there is a heavy swell.

Small vessels can take anchorage in Caleta Pajonal, about 0.3 mile E of the S entrance point, in 9.1m, fine sand. The anchorage is well-protected from S winds.

Punta Pena Blanca (27˚46'S., 71˚05'W.) is rocky. A hill, with a small knoll at its W end, lies close E of the point. Rocks fringe the point to a distance of about 0.5 mile. Roca Pena Blanca, close NW of the point, is above-water and conspicuous. South of Punta Pena Blanca are low coastal hills which are covered with yellow sand, except near their summits where there are outcrops of rock.

Caleta Totoral Bajo, about 4 miles SSW of Punta Pena Blanca, lies at the foot of a valley in which there is a settlement. The cove is deep, but heavy seas are common here. Coastal vessels call here occasionally for ore.

Punta Totoral, about 2 miles SW of Caleta Totoral Bajo, is low and rocky.

Caleta Matamoros, about 2.5 miles S of Punta Totoral, is well-protected from S winds, but it is open to N winds. The shores of the cove are generally low, but backed a short distance inland by a high range of hills, some of which attain a height of 747m.

Anchorage.—Vessels of moderate size can take anchorage off the S entrance point of the cove, in 13.7 to 18.3m. Care must be taken not to anchor too close to the shore in depths less than 13.7m, as the bottom is rocky at these depths. North winds send a heavy swell throughout the cove.

Puerto de Carrizal lies about 11 miles S of Caleta Matamoros. The coast between is high and steep. Most of the points along this stretch of coast are fringed by rocks which lie up to 0.1 mile offshore. A high, rocky, point projects from the coast about 0.8 mile S of Caleta Matamoros. A small cove, about 1 mile S of this point, is sheltered from S winds and can accommodate a small vessel. A similar cove lies about 1.5 miles farther S. The S entrance point of the latter cove is high and has a rounded hummock on it. Several steep hills rise E of the point.

4.46 Puerto Carrizal Bajo (28˚04'S., 71˚10'W.) (World Port Index No. 14620) lies between Isla Carrizal and a point nearly 0.5 mile NE. It is well-protected from the prevailing winds by Isla Carrizal. During N winds, a rough sea enters the port. Fogs occur usually only during the winter season. Puerto Carrizal Bajo is a small port for the shipment of iron ore. The port is little used because of the lack of trade. An old wharf, of rails and slag, has a depth of 2.4m alongside and can be used as a landing. A government -owned fisherman's wharf was built in 1998 immediately to the NE of Escoria Point. The wharf has a length of 57m and a width of 7m. The depth alongside is 3m.

There are depths of 11 to 20.1m in the outer part of the harbor N of the entrance. Depths decrease gradually S toward the head of the harbor. There are depths of 7 to 7.9m in the center of the harbor abreast the N end of Isla Carrizal. The E and S shores of the harbor are fringed with shallow water and rocks to distances of 0.1 to 0.2 mile offshore. Shallow water extends up to 0.3 mile N from the S shore of the harbor.

A rock, with a depth of about 4.1m, has been reported a little over 0.3 mile NNW of the NW extremity of Isla Carrizal. Roca Arequipa, with 11m over it, lies about 0.3 mile N of Isla Carrizal. A 9.6m patch is charted nearly 0.3 mile NNE of the island. Submerged rocks lie up to 0.1 mile N of Isla Carrizal. Roca Conquest, with less than 1.8m over it, lies about 128m ENE of the NW extremity of Isla Carrizal.

Isla Carrizal is nearly round and about 6m high. It lies about 27m N of Punta Escoria, on the W side of the harbor. The island and the point are connected by an isthmus of sand, shingle, and mine waste. An islet, fringed by reefs, lies about 0.1 mile W of Punta Escoria. Punta Barruel lies nearly 0.8 mile NNE of Isla Carrizal. An islet lying close off this point has reefs off its W and S sides. These reefs lie up to 119m off the point.

The harbor can be divided into two parts. The outer harbor lies N of Isla Carrizal. The inner harbor recedes nearly 0.5 mile SSE between Isla Carrizal and a point on the mainland about 0.3 mile E. A church and warehouse near the wharf are prominent. Numerous fishing craft are found in the vicinity of the harbor. Local knowledge is required.

Anchorage.—The best anchorage for large vessels is a little over 0.3 mile NNE of Isla Carrizal, in 11.9 to 15.5m, sand.

Ships of deep draft should moor and unmoor at high water. Ships drawing more than 9.1m should not use the berth due to the proximity of the above-described 9.6m shoal.

Small vessels may take anchorage about 0.2 mile ENE of Isla Carrizal, in 7.3 to 9.1m, sand.

4.47 Caleta Herradura de Carrizal (28˚06'S., 71˚11'W.) recedes about 0.5 mile E between a point about 1.3 miles SW of Punta Escoria and Punta Herradura, about 0.5 mile SW. A

deep valley, which extends inland from the head of the cove and separates two high ranges of mountains, is a good landmark for recognizing the cove. The range to the S of the valley has a hummock on its summit, it is the higher of the two ranges, and can be seen distinctly both from the N and S.

Islita Herradura lies about 0.2 mile S of the NE entrance point of the cove. Low rocks extend 0.2 mile NW from Punta Herradura, and to a vessel approaching from S they appear to extend across the entrance of the cove. Rocas Baja, two rocks with less than 1.8m over them, lie about 0.2 and 0.3 mile NW of Punta Herradura. A rocky shoal lies about 0.5 mile SW of Punta Herradura and about 0.3 mile offshore.

The entrance of Caleta Herradura de Carrizal, between the rocks which extend NW from Punta Herradura and Islita Herradura, is about 0.3 mile wide. Depths of 13.7 to 35m in the entrance decrease gradually toward the head of the cove. The head of the cove is bordered by shallow water which extends from 91 to 274m offshore.

Anchorage.—Large vessels may take anchorage in Caleta Herradura de Carrizal, about 0.2 mile S of the W end of Islita Herradura, in 18.3m. Small vessels can anchor about 0.3 mile SE of the E end of Islita Herradura, in 7.3m, fine sand. This latter anchorage is too narrow for large vessels. The anchorages are protected from N and S winds, but N winds send a swell into the cove.

4.48 Punta Molle (28˚11'S., 71˚11'W.) is low and rocky. Above and below-water rocks, the outer rock of which is high and de-tached from the others, extend 0.8 mile W from the point.

Punta Lobos, a conspicuous point about 7 miles S of Punta Molle, is rugged and has several hummocks on it. A short distance E of the point there are two low hills, and within them the land rises steeply to a height of about 305m. Punta Lobos is surrounded by submerged rocks.

A rocky shoal, which breaks, lies 2.5 miles SE of Punta Lobos and 0.8 mile offshore.

Cabo Norte, about 5 miles S of Punta Lobos, is low and rocky. Punta Negra, low and rocky, lies about 2 miles S of Cabo Norte. A beach extends about 3 miles SSW from Punta Negra. The Rio Huasco enters the sea through this beach; the river is subject to heavy freshets, but the water is kept low by numerous irrigation channels.

Huasco (28˚28'S., 71˚15'W.)

World Port Index No. 14610

4.49 Huasco, along with the neighboring terminals of Santa Barbara and Guacolda, lies at the SE end of a bight which recedes nearly 1.5 miles SE between Punta Negra and Peninsula Guacolda, about 4 miles SW. The town of Huasco is situated on the SE shore of the bight.

Winds—Weather.—The climate is mild with moderate temperatures and very occasional rains. Prevailing winds are SW, strong in summer, and there can be swells at any time. Fog is unusual. Generally, storms from the sea occur during the winter months of May through August, particularly at fall and the change of the moon, but they may also be experienced during the summer.

Depths—Limitations.—The Santa Barbara terminal is presently out of service (1992). It was used for loading ore, but has been out of operation for several years.

The Guacolda Terminal complex is located on the W side of the bay. Guacolda Terminal I is 183m long and can accommodate vessels with a maximum length of 240m and a maximum draft of 13.5m. This terminal is used for coal and oil. Guacolda Terminal II is 200m in length and can accommodate vessels of 315m length overall and draft of 22m. It is used for the loading of ores in bulk.

Aspect.—Peninsula Guacolda, dark in color, is connected to the mainland by a low causeway. Islotes Los Puentes, whitish in color and up to 26m in height, extend NW from the SW side of the peninsula. Rocks and breakers lie between these islets. Islote Blanco is the outermost of Islotes Los Puentes, lying about 1 mile WNW of the peninsula.

Punta Larga, 1.5 miles E of Peninsula Guacolda, is low, wide, and rocky. The shore in the vicinity of the point is covered with stones out of which project masses of craggy rocks. Islote Cayo, 3m high, is the outermost islet N of Punta Larga, lying 0.3 mile N of the point. A patch, with a least depth of 9.5m, lies about 0.4 mile SW of Islote Cayo.

Cordon el Espinazo is a chain of rugged hills which rises a little over 0.5 mile SE of Peninsula Guacolda and extends inland. These hills are prominent from the W and S. A power plant is situated on the slopes and is conspicuous. Tetas de Huasco lie about 1.8 miles ESE of Peninsula Guacolda. An anchor painted on their NW side is visible at a considerable distance. Cerro Colorado rises to an elevation of 268m, about 0.3 mile S of Tetas de Huasco.

Cerro Huasco, 576m high and the highest mountain in this area, lies about 3.5 miles SE of the town. Los Picachos Negros consist of three conspicuous peaks, the highest being 71m high, lying close SE of the town. A prominent tank stands 0.3 mile SW of Santa Barbara Terminal. A conspicuous tank, 49m high, is situated near the center of the peninsula, and a prominent loading tower stands at the Santa Barbara Terminal.

Main lights are shown from Peninsula Guacolda and Islote Cayo. Islote Cayo Light is exhibited from a GRP tower, 3m high. Aeronautical obstruction lights are shown from a prominent radio mast standing on Cordon el Espinazo, about 0.8 mile SSE of the peninsula.

Several ranges are situated throughout the port and serve as leads to the piers or anchorage transits; they may best be seen on the chart.

Pilotage.—Pilotage is compulsory for vessels for both terminals. Pilots board about 0.7 mile NE of Peninsula Guacolda Light. The port is equipped with radiotelephone. Huasco Port Radio, VHF channel 16, is used. The vessel's ETA message should be sent via Valparaiso radio and arrangements made for agents to be kept fully informed. Vessels should contact the pilot 2 hours before arrival.

To assist in berthing and unberthing, the use of a tug with a minimum of 2,500 hp is available.

Anchorage.—Large vessels may take anchorage about 0.3 mile NNE of Islote Cayo, in 23.8 to 25.6m. Small vessels can anchor, in 11.9 to 12.8m, sand, about 0.2 mile E of Islote Cayo.

The bay is generally deep with a good holding ground of sand. Shelter from SW winds is afforded vessels here, but the bay is exposed to N winds which may be experienced in win-

ter. In the center of the bay there is good holding ground with a depth of 60m.

Vessels awaiting the pilot or berth may anchor a little over 0.5 mile E of Peninsula Guacolda, in 51 to 59m, mud.

Huasco to Coquimbo

4.50 Punta Mariposa (28˚29'S., 71˚16'W.), with islets lying up to 0.2 mile off it, lies about 0.8 mile SW of Peninsula Guacolda. There are a number of hummocks on the point. The land S of Punta Mariposa, as far as Punta Alcalde, consists of bare rocky mountains which rise abruptly from a stony slope to a height of nearly 610m. An iron ore installation is situated in Caleta Garcia, a cove lying about 0.8 mile SE of Punta Mariposa. The lights on the installation can be seen for over 20 miles. Punta Huasco Sur, about 1.5 miles SSW of Punta Mariposa, is low and is marked by a light.

Punta Alcalde (28˚34'S., 71˚20'W.) projects about 2.8 miles W from the general trend of the coast and terminates in a small promontory. The point is the W end of a chain of mountains and is conspicuous. Foul ground extends up to 1 mile NW through N to NE from the point.

Caution.—A line of breakers has been reported to exist up to 1.8 miles off the coast between a position 2.3 miles SE of Punta Alcalde, to a position 2 miles NW of the S headland defining Caleta Playa Tontado. Vessels are advised to give the area a wide berth.

Caleta Playa Tontado, about 4 miles SSE of Punta Alcalde, has a sandy beach at its head. The land rises gradually E from the head of the cove and consists of sand with several rocky outcrops. One of these is a sharp pinnacle, higher than the rest and conspicuous.

4.51 Caleta Pena Blanca (28˚42'S., 71˚22'W.) lies about 7.5 miles S of Punta Alcalde. The shores of the cove are generally low. Hills close E of the cove have sandy sides and rocky summits. To a vessel approaching from the W, Caleta Pena Blanca appears as a small bay with a sandy beach.

Depths of 25.6 to 27.4m, about 0.3 mile N of the head of Caleta Pena Blanca, decrease gradually toward the shore. The E and S shores of the cove are bordered by shallow water and rocks to a distance of nearly 0.1 mile. A rock, 0.9m high, lies on the E side of the cove a little over 0.3 mile ENE of the W entrance point. A rock, 1.5m high, lies on the SE side of the cove about 0.3 mile E of the W entrance point.

Anchorage.—Vessels can take anchorage in Caleta Pena Blanca, about 0.1 mile ENE of the W entrance to the cove, in 18.3m. It is advisable to use two anchors, keeping the vessel on a W heading.

Punta Mogote Negro (28˚45'S., 71˚23'W.), about 4 miles SW of Caleta Pena Blanca, is low and rocky. Rocks lie up to 0.3 mile off the point. This point is the W end of a high range of hills, among which there is a sharp, prominent, black peak. Punta Honda lies about 2.8 miles SW of Punta Mogote Negro.

Bahia Quebrada Honda recedes about 0.8 mile SE between Punta Honda and Punta Islote, about 2 miles SW. The bay affords some shelter from S winds. Quebrada Honda, a deep ravine, extends inland from the SE corner of the bay. Anchorage may be taken about 0.3 mile off the mouth of the ravine, in 14.6 to 21.9m. Caleta Sarco del Sur, at which there is a village and a copper smelter, lies at the inner part of Bahia Quebrada Honda.

4.52 Punta Islote (28˚50'S., 71˚27'W.) is low and rocky. A small conical islet, 7.9m high and with a black summit, lies close off the point. A small bluff, about 10 to 15.2m high and composed of rocks of a yellowish-white color, rises close E of Punta Islote.

Bahia Sarco lies between Punta Islote and Punta Baja, about 2.5 miles SW. The bay is open to the N, but is comparatively well-sheltered from S winds which may blow with some force from May to September. Two prominent sandy beaches, each of which lies at the foot of a ravine, are on the SW shore of Bahia Sarco. The NE shore of the bay is formed by a number of smooth rocks which are interspersed by sandy beaches.

Cabo Bascunan (28˚51'S., 71˚30'W.), about 3.5 miles SW of Punta Islote, is radar prominent. The land rises gradually E of the point and forms a chain of low hills 0.5 mile E of the point. A chain of higher hills rises a little farther E. A rocky islet, surrounded by foul ground, lies about 0.2 mile W of Cabo Bascunan. About 0.5 mile S of the cape is a submerged rock which lies about 0.2 mile offshore.

Caution.—The waters S of Cabo Bascunan are reported to contain shoal patches which break, lying up to 1 mile off the coast.

A rock is reported to lie about 2.5 miles SW of Cabo Bascunan. The rock is reported to lie under a cover of seaweed, but the existence of the rock is uncertain.

Punta Pajaros, about 4 miles SSW of Cabo Bascunan, is low and rocky. Cabo Leones, about 5 miles S of Punta Pajaros, extends about 1 mile SW from the general trend of the coast. The point is low, yet somewhat prominent, and is the most salient projection on this part of the coast. Rocks extend more than 0.5 mile from all sides of Cabo Leones, and the cape should be given a wide berth.

Punta Gorda, about 3.5 miles SSE of Cabo Leones, is low, steep, and backed to the E by several low hills. Rocks lie up to 1 mile W and N of the point.

4.53 Isla Chanaral (29˚02'S., 71˚36'W.), about 4 miles W of Punta Gorda, is almost flat except at its S end where there is a hill, 158m high, which is surmounted by a hillock. Rocks extend about 0.5 mile S from the island and about the same distance from the NW side of the island. Islotes Azocar consist of two islets which lie about 0.2 mile W of the SW end of Isla Chanaral. A cove on the N side of the island has an anchorage for small vessels close off its entrance. The cove can be identified by a flight of wooden steps, 60m high, from which a track leads to the light tower. There is a derrick near the steps. A smaller cove, Caleta Buena Pesca, lies close W of the above cove.

A main light is shown from Isla Chanaral and the island is reported to be radar prominent.

Caution.—Isla Chanaral is reported to lie about 1 mile NE of its charted position. Caleta Chanaral, Ensenada Gaviota, and the adjacent coast, described below, are reported to lie about 1.8 miles E of their charted positions.

Caleta Chanaral recedes nearly 0.5 mile SE between an unnamed point 1.5 miles SE of Punta Gorda and Punta Sur, nearly 1 mile SW of the unnamed point. The land around the cove is low with ridges of low hills rising from the points. The tops of the ridges are rugged and rocky, and the land is sandy and barren. A range of high hills lies several miles E of the cove.

Caleta Chanaral is well protected from N and S winds, but a heavy swell sometimes sets into the cove from the SW.

The N headland has rocks extending up to 0.1 mile S, and 0.2 mile W of it. The S headland is rock-fringed for a distance of 0.3 mile W, while 0.4 mile WNW of it exist breakers. The coast of the cove is fringed by rocks and foul patches up to 0.1 mile off its E shore, and 0.2 mile off its S shore. Depths of 23 to 25m in the outer part of the cove decrease to 9.1 to 11m, about 0.1 mile offshore.

Ensenada Gaviota (29˚05'S., 71˚31'W.) recedes about 1 mile SE between Punta Sur and Punta Rancagua, nearly 1.5 miles SW. Submerged rocks lie up to 0.1 mile off the E shore of the inlet, and above-water rocks lie up to 0.1 mile off the S shore of the inlet. Both entrance points of the inlet are low and rocky. Punta Rancagua is surrounded on all sides by foul water to a distance of 0.3 mile. Heavy swells set into the inlet.

Depths of 13.7 to 28.7m in the outer part of the inlet decrease gradually toward the head of Ensenada Gaviota.

Small vessels load ore at a small pier situated on the SE shore of the inlet. There is a depth of 1.5m at the pier.

Anchorage.—Small vessels may take anchorage in the inlet about 0.5 mile ENE of the N extremity of Punta Rancagua, in about 20m, sand. Care must be taken to avoid dangers which extend 0.3 mile NW and N from this point.

4.54 Bahia Carrizal (29˚06'S., 71˚29'W.) recedes about 2 miles E between Punta Rancagua and Cabo Carrizal, about 3.5 miles S. Cabo Carrizal is low and rocky with a remarkable round summit on it. The point is backed by high land. Bahia Carrizal is not suitable for vessels. Rocks and reefs fringe the shore of the bay at about 0.5 mile off. Rocks extend about 1 mile from the SE shore of the bay and about 1.5 miles S from Punta Rancagua. A rock, awash, lies in the middle of the entrance to the bay.

Caleta Apolillado recedes about 0.5 mile E between a point about 0.8 mile SE of Cabo Carrizal and Punta Zorros, nearly 1 mile SSW. Punta Zorros is low and rocky. A rock, awash, lies about 55m W of Carrizal. Depths of 18.3 to 21.9m in the outer part of the cove decrease gradually toward the shore, but caution is advised as the E shore of the bay is reported to be silting. The best anchorage is about 0.3 mile NNE of Punta Zorros, in 18.3m, sand. The anchorage cannot be recommended as it is completely open to the W and affords little shelter from the N or S. A constant swell prevails in the cove, and the sea breaks on the beach.

Roca Beta and Roca Lambda are two low, rocky islets which lie about 0.8 mile WSW and a little over 0.5 mile SW, respectively, of Punta Zorros. A small above-water rock lies about midway between these two rocks. The passage between Roca Lambda and the shore has not been carefully examined, but it is foul. A wreck lies about midway between Roca Lambda and the shore.

4.55 Bahia Choros (29˚13'S., 71˚30'W.) lies between Punta Zorros and Cabo Choros, about 5 miles SSE. Isla Damas, Isla Choros, and Isla Gaviota, which lie W and SW of Cabo Choros, protect the bay.

Isla Damas, the smallest and N of these islands, lies with its NW extremity nearly 3.5 miles SSW of Punta Zorros and is radar prominent. Three hills; Morro Norte, 46m high, Pico Singular, and Morro Sur, 31m high, lie on the N, central, and S parts of the island, respectively. A small peninsula extends about 0.2 mile W from about the center of the island. A light is shown from the N extremity of the island.

The W shores of Isla Damas are generally rocky and fronted by breakers. Caleta Lynch is a well-sheltered cove near the center of the E side of the island. A reef, on which stands conspicuous Roca Cutter, extends about 0.3 mile S from the S extremity of the island. Rocas Falso Cutter, two high rocks, lie at the outer end of a reef which extends about 0.2 mile E from the E side of the island and forms the S limits of Caleta Lynch.

Paso Damas, about 0.8 mile wide, separates Isla Damas from Isla Choros to the S. Roca Beta, above water, lies nearly in mid-channel, about 0.5 mile W of the peninsula which extends W from Isla Damas. A rocky patch of 9.1 to 10.1m lies in about the center of this channel, about 0.5 mile S of the S extremity of Isla Damas. Because of these two dangers and the shallow water which extends S from Isla Damas and NE from Isla Choros, Paso Damas is not recommended.

4.56 Isla Choros (29˚16'S., 71˚33'W.) largest of the three islands fronting Bahia Choros, lies farther S and W than either of the other two. Isla Choros is hilly, irregular in outline, and rises to a height of 110m. The shores are cliffy and rugged; there is no anchorage. The SW end of the island resembles a castle.

A pyramidal rock lies off the S end of Isla Choros. This rock should be given a berth of at least 0.5 mile to avoid the reef which extends S from it. Roca Alfa, 1.8m high, lies about 0.4 mile S of the S end of Isla Choros and is the outermost of the dangers extending S from the island. Roca Gamma, 0.9m high, lies a little over 0.5 mile WNW of the S end of the island, and is the outermost of the dangers off the W side of the island. Dangers surround Isla Choros on all sides to a maximum distance of about 0.2 mile.

Paso Choros is about 2.5 miles wide between Isla Choros and Isla Gaviota to the E. This channel is deep and clear, but a wide berth must be given Isla Gaviota to avoid the reef extending SW from it.

Isla Gaviota lies with its NE end about 0.2 mile SW of Punta Bernard, a point a little over 0.5 mile NW of Cabo Choros. The SW end of the island lies a little over 1.5 miles SW of Cabo Choros. The island is low, and rises gradually from its E side toward its SW end, where it attains a height of 37m.

Isla Gaviota is surrounded on all sides by above and below-water rocks which lie as much as 0.3 mile offshore. Roca Chata lies on the outer edge of shoal water that extends about 0.3 mile E from the E point of the island. Roca Saliente lies about 0.2 mile S of the S end of the island. Shoal depths have been reported to lie about 1 mile SW of the S end of Isla Gaviota.

Passage should not be attempted between Isla Gaviota and the mainland. There are numerous submerged rocks in this passage.

The prevailing current in Bahia Choros sets N at velocities of 0.5 to 2 knots. The current sets toward the dangers which extend S from Isla Damas. Rollers, common on the coast farther N, are experienced here.

Anchorage.—Surgidero Norte, situated N of Isla Gaviota, is suitable for large vessels. It is sheltered from S winds by Isla Gaviota. The sea, which enters through Paso Choros, is not heavy enough to be dangerous. The best berth is about 0.5 mile NNW of the N extremity of Isla Gaviota, in 12.8m, sand.

Caleta Lynch, on the E side of Isla Damas, is the best anchorage in Bahia Choros, being well-protected from W winds and suitable for large vessels. Anchorage can be taken about 0.2 mile offshore, in 14.6 to 16.5m, sand. Rocas Falso Cutter, mentioned above, should be given a berth of at least 0.2 mile.

4.57 Cabo Choros (29˚15'S., 71˚28'W.) is rocky and about 31m high. Numerous submerged dangers lie off the cape. Arrecife Toro lies about 6.5 miles SSW of Cabo Choros, and about 9 miles W of Punta Mar Brava. The reef consists of several above-water rocks and a submerged rock over which the sea breaks. The breakers are nearly always visible.

Playa Choros, a sandy beach on which there is always a heavy surf, extends about 9 miles SE from Cabo Choros. Punta Mar Brava, at the SE end of Playa Choros, is low and rocky with submerged rocks close off it. Near the point is a large white patch of sand which is prominent from the W.

Punta Chungungo, low and rocky, lies about 2.5 miles S of Punta Mar Brava, the coast between being low and rocky. A remarkable saddle-topped hill, with a hummock in the middle, rises close E of Punta Chungungo. When seen from the S, the hill appears as the N end of a high range that extends from E of Caleta Totoralillo and is from 610 to 914m high.

Isla Chungungo, about 1 mile SW of Punta Chungungo, is low and rocky. Submerged rocks lie off the N side of the island, and there is foul ground between the island and the point.

Punta Barrancones (29˚25'S., 71˚21'W.) is steep and rocky. An islet and rocks lie within 91m of the point. Caleta Tinajas recedes a little over 0.5 mile NE between Punta Barrancones, and Punta Tinajas, about 1 mile SE. Punta Tinajas is fronted by islets and rocks, is steep and rocky, and rises to a hill 33m high.

There are depths of 11 to 23.8m in the outer and central parts of Caleta Tinajas. Above and below-water rocks line the entire shore of the cove and lie up to 0.1 mile offshore. Good anchorage can be taken in the cove by small vessels, about 0.4 mile NNW of Punta Tinajas, in 20.1m, sand.

Punta Medamtos lies about 1.3 miles S of Punta Tinajas. A 28m hill, close E of the point, is surmounted by a beacon, which consists of a concrete monolith. Punta Mostacilla lies nearly 0.8 mile SW of Punta Medamtos. Foul ground extends about 183m W and about 46m N from the point. A light is shown from the point.

4.58 Cruz Grande (29˚27'S., 71˚20'W.) lies on the S shore of Caleta Cruz Grande, which recedes a little over 0.5 mile SE between Punta Medamtos and Punta Mostacilla. A breakwater, about 92m long, extends E from a position about 0.1 mile SE of Punta Mostacilla. The harbor can be divided into two anchorages; the outer anchorage ENE of Punta Mostacilla, and the inner anchorage for tankers. A basin, about 220m long and 70m wide, is situated about 0.3 mile SE of Punta Mostacilla. Tankers anchor or moor to buoys. Vessels discharge cargo at anchor.

Winds—Weather.—Southwest winds prevail in all seasons. A N breeze sometimes occurs in the early morning.

Morning fogs are most frequent from March to November, lasting almost to midday. Most days, low clouds cover the hills, completely obscuring the valleys.

Depths—Limitations.—Depths of 33 to 42m in the entrance decrease gradually toward the head of the cove. There are depths of 21.9 to 23.8m at the anchorage. There is a least depth of about 8.8m at the tanker berth. Foul ground extends about 0.1 mile N and W of Punta Mostacilla.

Aspect.—The most conspicuous objects in Caleta Cruz Grande are the disused chimney of a power station, 0.6 mile E of Punta Mostacilla, and three silver tanks situated 0.1 to 0.2 W of the chimney.

A depth of 6.1m was reported (1992) about 7.5 miles W of Punta Mostacilla.

Pilotage.—Pilotage is compulsory. The pilot boards about 0.5 mile W of the entrance. Pilots should be requested from Coquimbo 7 days in advance.

Anchorage.—The best anchorage during SW winds is under Punta Mostacilla, where the shore is steep-to. A vessel can anchor, in 32.9 to 40.2m about 0.3 mile W of Punta Medamtos. During NW winds vessels should anchor about 0.3 mile ENE of Punta Mostacilla, in 21.9 to 23.8m.

Vessels should not anchor in the inner part of the cove during winter, as during this time the sea breaks violently in this area.

The explosives anchorage lies about 0.8 mile SSW of Punta Tinajas.

Note.—It was reported that the harbor basin was out of service and the port closed.

Caution.—Magnetic disturbances have been observed in Caleta Cruz Grande. These are ascribed to the proximity of masses of iron ore.

4.59 Caleta Temblador (29˚28'S., 71˚20'W.) and Caleta Totoralillo are two coves which recede nearly 1 mile SE between Punta Mostacilla and Punta Totoralillo, about 1.8 miles SSW. Punta Totoralillo is steep and the land rises abruptly, forming a conspicuous hill, 112m high. On the shore of Caleta Totoralillo is a pile of slag which stands out conspicuously from the white sand.

Los Farallones (29˚28'S., 71˚21'W.) consist of a group of islets and rocks which extends nearly 0.8 mile N from Punta Totoralillo. The largest islet, about 0.2 mile N of Punta Totoralillo, is 33.5m high. The N islet is 10.9m high, and the S islet is 14.6m high.

An above-water rock lies about 43m N of Punta Totoralillo, and a rock with 2.4m over it lies about 50m E of the above-water rock.

Isla Tilgo lies about 3 miles S of Punta Totoralitto and about 0.1 mile offshore. Except from a short distance off it, the island appears to be a projecting point.

Bajo Zoraida, a shoal with two rocky heads, lies about 0.3 mile NE of the N islet of the Los Farallones. The N rock has about 3.9m of water over it and the S rock has about 3.1m over it. Roca Valentine, existence doubtful, is charted as having less than 1.8m over it in a position about 0.5 mile NE of the N islet of Los Farallones.

There are depths of 11 to 20m in the outer part of Caleta Totoralillo.

Anchorage.—The best anchorage is in the entrance of the cove, about 0.3 mile E of the summit of the largest of the Los Farallones, in 16.5m. Farther E, the bottom is very rocky, and vessels are liable to lose their anchors. Inside the 10m curve the depths are very irregular, particularly in the S part of the cove.

Islotes Pajaros (29˚35'S., 71˚33'W.), about 10 miles W of Isla Tilgo, are two islets which are steep and rocky, 30 to 46m high, and completely devoid of vegetation. They are separated by a channel about 1.3 miles wide. Reefs extend about 0.5 mile W and SE from the N islet. A reef, on which the sea breaks, extends about 1 mile SW from the S and largest islet. A light is shown from the S islet.

Roca Negra (29˚36'S., 71˚19'W.), about 3.3 miles SSE of Isla Tilgo, lies on foul ground about 91m offshore. An unnamed point E of Roca Negra forms the N entrance point of Caleta Los Hornos.

Caleta Los Hornos recedes nearly 0.8 mile E between the above unnamed point and Punta Blanca, about 1.8 miles S. Roca Blanca, above-water and low, with submerged rocks close W of it, lies about 91m W of Punta Blanca. Quebrada Honda, a deep straight ravine extending inland from the S shore of the cove, is a good mark for recognizing Caleta Los Hornos. Foul ground, with rocks awash, extends about 0.1 mile offshore near the center of the cove. A small pier, used by fishing craft, is situated at the mouth of Quebrada Honda.

Anchorage.—Vessels may take anchorage close to the S shore of Caleta Los Hornos somewhat sheltered from S winds. The best anchorage is about 0.3 mile off the S shore of the cove, in 18.3m. Small vessels can anchor about 0.2 mile off the S shore, in 11 to 14.6m.

Caution.—Severe magnetic disturbances have been reported near the coast in this vicinity, particularly in the vicinity of Caleta Los Hornos.

4.60 Punta Hornos (29˚38'S., 71˚20'W.) is high, steep, and rocky. Cerro Juan Soldado, about 3.5 miles SE of Punta Hornos, is conspicuous. The N side of this hill is steep, but its S side descends gradually towards the SSW.

Caleta El Arrayan, about 3 miles S of Punta Hornos, affords some shelter to small vessels from S winds. A rocky point forms the S entrance point of the cove.

Punta Poroto (29˚45'S., 71˚22'W.) is low, steep, and rocky. A rock, with about 2.3m over it, lies almost 0.5 mile S of the point. The sea breaks over this rock when a strong wind is blowing. A depth of 27.4m lies 2.25 miles SW of Punta Poroto. Punta Falso Poroto is about 1 mile SSE, and similar in appearance to Punta Poroto. Three islets lie from 0.25 to 0.5 mile, respectively, SSE of Punta Falso Poroto. Cerros del Cobre rises to a height of about 1,951m, about 2.5 miles NE of Punta Poroto.

Punta Teatinos, about 4.5 miles SSE of Punta Poroto, is steep and rocky. The land behind the point rises in ridges, which gradually become higher as they recede from the coast. It is reported that the coast between Punta Poroto and Punta Teatinos recedes farther E than is indicated on the charts.

Coquimbo (29˚57'S., 71˚21'W.)

World Port Index No. 14570

4.61 The port of Coquimbo occupies the S end of Bahia de Coquimbo, which recedes nearly 3 miles E between Punta Teatinos and Punta Tortuga about 7 miles S. The city of Coquimbo is situated on the SW shore of Bahia de Coquimbo. The roadstead affords good shelter in all seasons. La Serena, an important city, is situated about 1 mile inland and about 5 miles NE of Coquimbo.

Coquimbo Home Page

http://www.puertocoquimbo.cl

Winds—Weather.—Southerly and SW winds blow strongly outside the bay during the greater part of the year, but they are usually moderate inside the bay. Northwesterly winds occur during the winter months, but are usually of short duration and seldom blow with such force as to produce much sea. Easterly winds off the land are extremely dangerous and occur on rare occasions during the winter. Temperatures are moderate and there is very little rain.

Fogs occur in Bahia de Coquimbo and are most frequent during the winter, when they may be very dense.

Tides—Currents.—There are practically no tidal currents in Bahia de Coquimbo, but in the vicinity of the Farallones de Coquimbo the currents may attain velocities of 1.5 to 3 knots. The tidal current sets NE with a rising tide and SW with a falling tide, the former being the stronger.

Tides rise about 1.2m at HW and 0.3m at LW, although tidal differences of up to 4.6m have been reported (1991) between mean low water and mean high water.

Currents sometimes enter Bahia de Coquimbo from various directions, causing ships at anchor to swing in diverse directions.

Depths—Limitations.—A quay, 378m long, is situated on the E side of the peninsula. Generally, vessels of up to 180m in length can be accommodated, with maximum acceptable drafts of 9.5m at Berth No. 1 and 9.5m at Berth No. 2. It is reported that vessels of up to 38,800 dwt and 200m in length, with drafts of 10.0m, have been accommodated. This port also has good cranes and storage area. Vessels awaiting berths should anchor at the roadstead.

Vessels should expect small craft to be anchored N and S of the pier area.

Aspect.—Punta Tortuga is the N extremity of Peninsula Coquimbo. The W side of the peninsula is high and steep, especially at N end.

Farallones de Coquimbo consist of two groups of rocky islets and submerged rocks lying NW of Peninsula Coquimbo, which forms the SW side of Bahia de Coquimbo. Islotes Pajaros de Afuera, the outer group, lie with the largest islet, about 1 mile NW of Punta Tortuga. A rocky shoal patch, with a least depth of 5.9m, lies 0.8 mile NNE of the largest islet.

Depths of 11.2m and 17.4m lie 2.5 miles and 4.5 miles NW, respectively, of Islotes Pajaros de Afuera.

Islotes Pajaros Ninos lie about 0.5 mile WNW of Punta Tortuga.

Rocas Pilcachos, consisting of three above-water rocks and a rock with less than 1.8m over it, lie from 0.1 to 0.3 mile WSW of Islotes Pajaros Ninos. The central and NW rock is 5.5m high.

Paso de Afuera, the passage separating these two groups, is about 0.4 mile wide, but is not recommended for vessels of any kind. A wreck lies in this passage in a position about 0.7 mile NNW of Punta Tortuga.

Paso Interior separates Rocas Pilcachos and Islotes Pajaros Ninos from Peninsula de Coquimbo. The channel has a least width of about 0.4 mile and is suitable for small vessels. There are general depths of 28 to 42m in the channel, but a rock with 8.8m over it lies nearly in mid-channel about 0.7 mile WSW of Punta Tortuga. An 11.9m patch lies 0.2 mile NNW of the same point.

Roca Havannah, with 7.2m over it, lies about 0.5 mile ENE of Punta Tortuga. Roca Dorsetshire, a pinnacle rock with less than 2.8m over it, lies about 0.4 mile E of Punta Tortuga. Roca Pelicanos, 4.9m high and white, lies close offshore and S of Roca Dorsetshire.

Foul ground, consisting of the remains of a wreck with a depth of 9.1m, lies about 0.1 mile NE of the N corner of the quay. A dangerous sunken wreck, with 2.7m over it, lies about 0.5 mile SE of the N corner of the quay. Several above water and sunken wrecks lie up to 0.5 mile S of the quay, and may best be seen on the chart.

Peninsula de Coquimbo, with its rugged hills and ravines and yellowish color, is prominent. Farallones de Coquimbo are also good marks. A main light is shown from Punta Tortuga. A radiobeacon is situated at the light structure. An unused lighthouse and the former light keeper's house stand about 137m SSE of the Punta Tortuga light structure and are conspicuous. A prominent church stands 1.5 miles S of the point.

A conspicuous cross stands on Cerro La Cruz, a 151m hill a little over 0.8 mile S of Punta Tortuga. There are lighted television towers in the vicinity of the cross. A conspicuous radio mast stands on the S shore of the bay, about 2 miles SE of Punta Tortuga. A conspicuous clump of trees stands at a farm about 3 miles SE of Punta Tortuga. A conspicuous water tower with obstruction lights is situated 3 miles SE of Punta Tortuga Light. A cement factory, the lights of which are visible to vessels approaching Bahia de Coquimbo at night, is situated on the N shore of the bay about 1.5 miles E of Punta Teatinos.

Five sets of range lights are exhibited from various positions on the bay's shores to assist vessels in entering, berthing, and anchoring. In addition to a light, the ranges show a white diamond daymark with red diagonal stripes.

Pilotage.—Pilotage is compulsory. The pilot boards in an area 1.1 miles NE of Punta Tortuga Light. Vessels should send their ETA 24 hours in advance. The port may be contacted by VHF channel 14 or 16 and radiotelephone. Pilots are available for Guayacan.

Anchorage.—A good berth for large vessels during the winter months is about 1.3 miles E of the cross on Cerro La Cruz, in 13.7m. Small vessels can anchor in the SW corner of the bay, in 7.3 to 8.2m, sand and mud. The pilot assigns anchorage berths.

Caution.—A prohibited anchorage area, the limits of which are shown on the chart, lies off the quay.

When approaching the bay, vessels should guard against being set to the N by the prevailing swell, current, and wind, which always come from the S.

When approaching the bay from S, vessels should stay 3 miles from land, altering course to the E when well clear of the dangers N of Islotes Pajaros de Afuera.

Bahia Herradura de Guayacan (29˚58'S., 71˚22'W.)

World Port Index No. 14560

4.62 Bahia Herradura de Guayacan recedes about 1.3 miles SE. It is separated from Coquimbo by an isthmus, about 1 mile wide, that connects Peninsula de Coquimbo with the mainland. The villages of Aldea de Guayacan and Aldea de Herradura lie at the NE and SW corners, respectively, of the bay.

The approach to Herradura Bay is a fishing zone, so caution should be maintained during navigation into the port.

The harbor in the bay consists of two anchorages and a large pier for loading iron ore. There are several small piers on the S and W sides of the bay. An oil terminal berth is situated on the N side. The port is administered by Coquimbo.

Winds—Weather.—Southwest winds prevail although NE winds may be encountered in the early morning. Fog may be encountered at this time during the summer months.

Tides—Currents.—A NNE current has been observed setting across the entrance of the bay.

Depths—Limitations.—There is one T-head pier 268m from the shore, with a berth of 214m in length. Vessels up to 315m loa, 215,000 dwt, and maximum sailing draft of 16.2m can be accommodated.

Loading is from an elevator which can travel a length of 119m along the pier, the boom extends from 14 to 24m from the face of the pier.

There is an offshore oil berth near the N shore used for the discharge of clean products and LPG. Vessels moor to two stern buoys with ships head 225˚. The depth of water in the area is 15.6m.

Several small craft piers exist on the NE and S sides of the bay, and are best seen on the chart.

Aspect.—Punta Miedo, steep and rocky, is located about 2.3 miles SW of Punta Tortuga Light. The bay is entered between Punta Miedo and Punta Herradura, a little over 0.5 mile WSW. It is about 0.4 mile wide at the entrance and broadens to over 1 mile inside. Depths of 42 to 66m in the entrance decrease gradually toward the shore. Islita Mews, a small islet, lies about 0.2 mile NW of Punta Miedo. Roca Knowsley, with a depth of 1.1m, lies about 0.1 mile offshore, about 0.4 mile SE of Punta Miedo. Rocks, with less than 1.8m over them, lie between Roca Knowsley and the shore.

At night, when making a landfall from W, the lights of Guayacan will be sighted before the lighted aids.

The bright lights at a fish factory situated close E of Punta Miedo are conspicuous.

Cerro Alegre, a prominent hill 38m high, stands about 0.5 mile E of Punta Miedo.

Lights are shown from Punta Herradura and Isleta Mews. Several sets of ranges situated within the bay assist vessels in entering and berthing.

Pilotage.—Pilotage is compulsory for vessels of 200m loa and over, and also for all foreign vessels. Vessels must anchor in Coquimbo Bay to board the pilot, as the pilot will not board outside Herradura Bay; VHF channel 16 and 2182 kHz are used. The vessel's ETA should be sent by radio 5 days, 96 hours, 48 hours, and 24 hours in advance.

Anchorage.—Anchorage can be taken in the S part of the bay, leaving room for movements to and from the pier. The holding ground is good. The anchorages are protected from all winds, but strong NW winds send a heavy swell into the bay which causes vessels to roll considerably. This occurs more often during the winter than at other times.

Caution.—Numerous fishing craft are found in the bay and in the approaches.

Magnetic disturbances have been reported about 1 mile NW of the bay entrance.

Bahia Herradura de Guayacan to Punta Lengua de Vaca

Punta Saliente (30˚01'S., 71˚26'W.), about 4 miles SW of the entrance to Bahia Herradura de Guayacan, is low and rocky. The land behind the point rises gradually until it joins a chain of high hills to the E. Foul ground surrounds the point, particularly on its S side. Two submerged rocks, on which breakers have been seen, lie about 0.3 mile off the point. Caution must be taken in foggy weather not to mistake Punta Saliente for Punta Tortuga, on the NW side of Peninsula de Coquimbo.

Punta Lagunillas (30˚06'S., 74˚24'W.), about 6 miles SSE of Punta Saliente, is about 9.1m high and rugged. It rises gradually toward the interior and joins a chain of high hills to the E. Many guano-covered stones lie on the point. From a distance, Punta Lagunillas has the appearance of a ship under sail. Foul ground surrounds the point to distances varying between 0.1 mile and 0.2 mile. Two drying rocks lie NW of the point, the outer lying about 0.3 mile offshore.

Bahia Guanaquero recedes about 3 miles SE between Punta Lagunillas and Punta Guanaquero, about 5 miles SW. The SW shore of the bay is formed of large rocks and cliffs, except for a small cove with a sandy beach at its head. The S and E shores of the bay are sandy, except Punta Morrillos, 3.5 miles E of Punta Guanaquero, which is formed of several small bluffs and is of a dark color.

Cerro Guanaquero, with three peaks, lies about 3 miles S of Punta Guanaquero. Cumbre Norte, 404m high, lies about 0.5 mile N of Cerro Guanaquero. Cerro Jotate, about 2 miles SSE of Punta Morrillos, is 417m high. Hills of less elevation lie N of Cerro Jotate.

The sea breaks violently on Playa de la Hacienda, the sandy beach between Punta Lagunillas and Punta Morrillos. The sand behind the beach shifts constantly and forms dunes of considerable size. Cerro La Parva, a low hill of yellow sand, lies about 1.5 miles NNE of Punta Morrillos.

Anchorage.—Anchorage can be taken in the SW corner of Bahia Guanaquero, in 20.1m, sand and mud. The anchorage is well-sheltered against SW winds. Northwesterly winds are rare and of little strength. Care must be taken to avoid a number of marine farms situated in the SW part of the bay.

4.63 Punta Guanaquero (30˚10'S., 71˚27'W.), the SW entrance point of Bahia Guanaquero, is high and steep. The point may be recognized by a hill, about 61m high, which rises over its extremity and can be seen a long distance. A rocky ledge, terminating in a high rock, extends about 0.2 mile NW from the point.

A concrete tower stands about 0.2 mile SSE of the above point.

Punta Barnes (30˚12'S., 71˚29'W.), about 2.5 miles SW of Punta Guanaquero, is rocky and fronted by above and below-water rocks to a distance of about 0.2 mile. Monte Barnes, about 1 mile S of Punta Barnes, is steep, rounded, and rises to a conical hillock.

Bahia Barnes recedes a little over 0.5 mile SE between a point, about 1.5 miles S of Punta Barnes, and the N extremity of Peninsula de Tongoy, about 1.5 miles SW. The bay has depths of 7.3 to 14.6m, sand, and is sheltered from S and SW winds.

Peninsula de Tongoy extends nearly 1 mile W from the general trend of the coast and is steep and rocky. Nine rounded hills, varying in height from 48 to 74m, stand on the peninsula. The peninsula is joined to the coast by a low sandy isthmus and appears as an island when seen from the N or W. Punta Errazuriz is the W extremity of Peninsula de Tongoy. Roca Cousino, with less than 3.2m over it, lies about 137m SW of Punta Errazuriz. Roca Morgan, which covers at high water, lies 137m WSW of the S extremity of the peninsula. A prominent white house with a television mast stands on the highest summit of the peninsula.

An aeronautical radiobeacon is situated about 1.3 miles SE of the peninsula.

4.64 Bahia Tongoy (30˚16'S., 71˚34'W.) lies between Peninsula de Tongoy and Punta Lengua de Vaca, about 6.3 miles W. Puerto Aldea occupies the S part of the bay, and Puerto Tongoy occupies the E part of the bay, S of Peninsula de Tongoy.

The W shore of Bahia Tongoy, for a distance of about 2.5 miles SSE of Punta Lengua de Vaca, is rocky with low cliffs. Then the coast trends about 2.3 miles farther SSE and is low and stony. Islote Morro Grande, a small promontory, 14.9m high, lies a little over 0.5 mile SE of Punta Lengua de Vaca. Rocas Megal, a rocky outcrop 115m high and painted white, lie about 1.8 miles S of Punta Lengua de Vaca. A conspicuous beacon, consisting of a black iron cross, 7m high and surmounted by a black triangle, stands on the highest part of Rocas Megal. A beacon (red framework, radar reflector; 3m in height) is situated on the end of a small pier at Caleta Hornilla (30˚17.5'S., 71˚37.2'W.). Two lighted beacons are shown in the SW part of the bay and may be seen on the chart.

The S and E shores of Bahia Tongoy consist of sandy beaches, the E shore being backed by sand dunes 12.2 to 15.2m high. Monte Notable, 3 miles S of Punta Errazuriz, is conspicuous. Cerros Barrancos Blancos, two hills, lie a little over 1 mile from the beach on the SE side of the bay; white patches on these hills make good landmarks.

Anchorage.—Anchorage can be taken in Puerto Aldea, in the SW part of Bahia Tongoy, about 1 mile off the S and W shores of the bay, in 9 to 12m. Vessels may also anchor closer

inshore, in 8.2 to 11m. The bottom is of soft muddy sand in some places, but in others it is hard.

During S winds, Puerto Aldea is calm, but a heavy sea sets in with strong N winds.

Anchorage can be taken anywhere on the E and SE sides of Bahia Tongoy, about 0.5 to 1 mile offshore, in 11 to 18.3m, sand.

The best anchorage in Puerto Tongoy is about 0.4 mile S of the S extremity of Peninsula de Tongoy in 12.8m. During N winds, there is good anchorage for small vessels about 0.3 mile SSE of the S extremity of the peninsula, in 7.3m, sand and clay.

With strong SW winds, anchorage in Puerto Tongoy becomes untenable. During such times, vessels can anchor in Bahia Barnes, N of Peninsula de Tongoy, which is well protected from S and SW winds.

Caution.—Abnormal magnetic variations have been reported in the vicinity of Bahia Tongoy. Cultivated shellfish beds are situated in an area close SW of Peninsula de Tongoy.

Punta Lengua de Vaca (30˚14'S., 71˚38'W.), the W entrance point of Bahia Tongoy, is described in paragraph 5.2.